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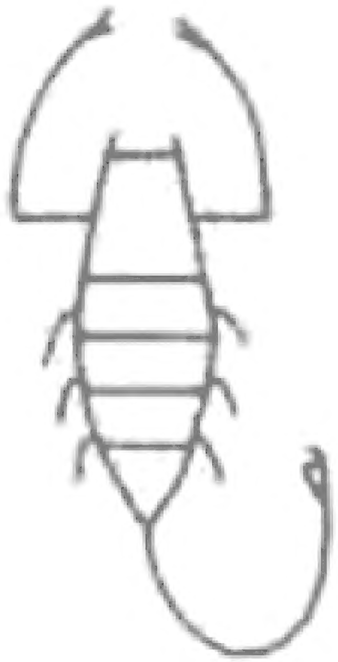

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A possible relict population of *Mesobuthus* (*Aegaeobuthus*?) *nigrocinctus* (Ehrenberg, 1828) in the Bishri Mountains of Syria (Scorpiones: Buthidae)

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Abstract

A new population associated to *Mesobuthus* (*Aegaeobuthus*?) *nigrocinctus* (Ehrenberg, 1828) is reported from the Bishri Mountains which are located east of Syria. The studied specimens were collected by Paul Pallary, who lived in North Africa. The populations from Bishri Mountains and Lebanon Mountains apparently are totally isolated by a large and dry region now occupied by the desert. Consequently in account of the disrupted distribution and some minor morphological differences presented by the two populations, a new subspecies is proposed to accommodate the population from Bishri Mountains. Only further investigations will allow reaching more precise conclusions about the status of these two populations, but in account of the political situation in this region of Syria this step seems impossible, at least for the moment.

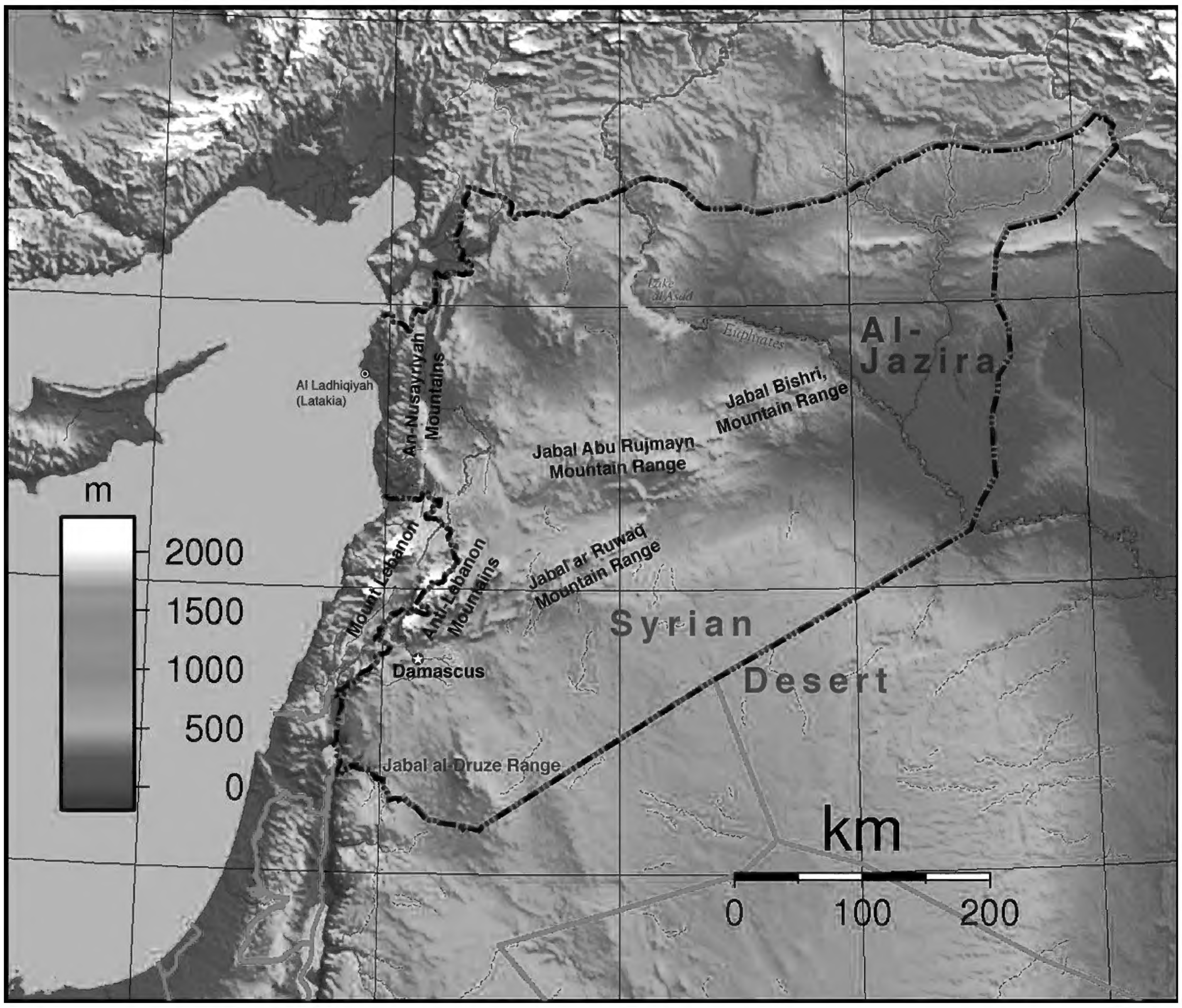
Keywords: Scorpion, *Mesobuthus nigrocinctus*, (*Aegaeobuthus nigrocinctus*?), Bishri Mountains, Syria.

Introduction

The genus *Mesobuthus* was created by Vachon (1950), in order to accommodate several species previously placed in other buthid genera and in special in the genus *Buthus* Leach, 1815. Subsequently some partial revisions were attempted, trying to clarify the taxonomic position of at least some species of this rather confused group (e.g. Vachon, 1958; Tikader & Bastawade, 1983). Global results, however, were only partially successful (Fet & Lowe, 2000). Recent publications such as the one by Fet *et al.* (2018)

contribute to the clarification of the *Mesobuthus caucasicus* complex, bringing new insights to the taxonomic position and distribution of several species. Nevertheless, some aspects, in particular about the precise distribution of some species or complex of species seem to require yet further investigations. One recent example was the precise identification of some *Mesobuthus* populations distributed in the Mediterranean region. During several decades *Mesobuthus gibbosus* (Brullé, 1832) was the single species accepted as valid in this geographic region. Fet *et al.* (2000) revalidated the old species *Mesobuthus nigrocinctus* (Ehrenberg, 1828) as distinct from *M. gibbosus* and suggested that it was a possible endemic element to the Lebanon Mountain range. Subsequently, Karataş (2007) reported the species from several localities in Turkey, but in all cases from moderate to high mountainous altitudes, 460 to 1550 m asl. This seems to confirm that the species is adapted to altitudes and absent from the arid plains.

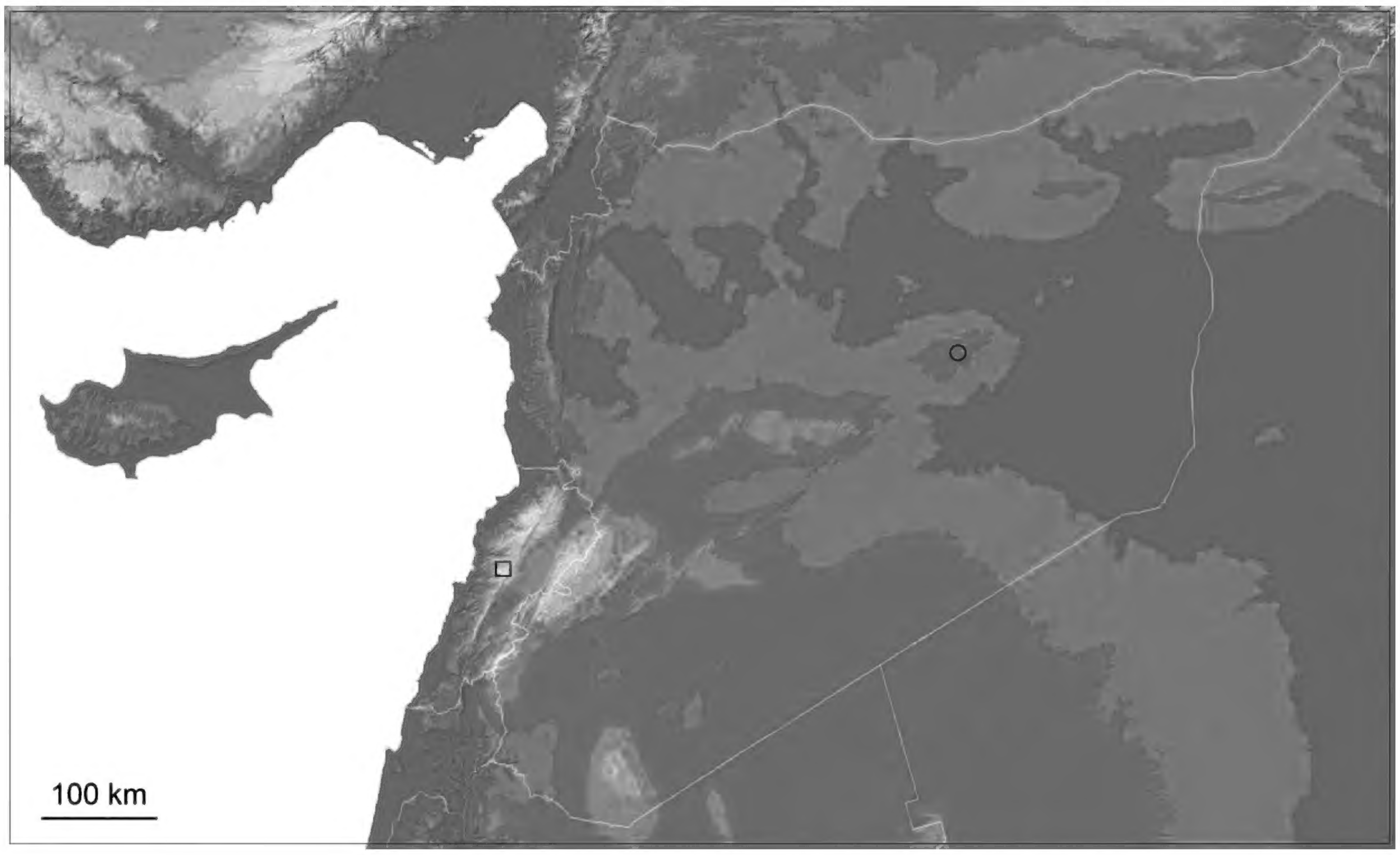
More recently, Kovařík (2019) took an arbitrary decision to divide the genus *Mesobuthus*, as well as other well defined genera, in several new generic entities. As already stated in previous studies (to be published), this kind of decision seems totally unjustified, corresponding rather to an artefact to create artificial new taxa. This division is therefore ignored at present.



Map 1. Topographic map of Lebanon and Syria showing the locations of Mt. Lebanon and Bishri Mountains.

Recently I was able to locate in the collections of the Muséum national d'Histoire naturelle in Paris a series of *Mesobuthus* collected in Syria which globally match the general characteristics of *M. nigrocinctus*. These were collected by Paul Pallary, a non-professional zoologist, who lived in North Africa and published an impressive number of

papers on zoology, mainly on malacology. He also produced a limited number of papers on scorpions, but basically from the North African fauna. Only in one of his last papers on scorpions, Pallary (1938) made reference to Syrian species, but limited his analysis to *Buthus judaicus* Simon, 1872 (= *Hottentotta judaicus* (Simon, 1872)). Nevertheless, it seems clear from his publications on malacology that P. Pallary did some intensive field research in Middle East and Syria (Bank & Menkhorst, 2009), in particular during the period when Syria and Lebanon were under French protection.



Map 2. Map of Lebanon and Syria with the locations of the studied material. *Mesobuthus* (*Aegaeobuthus*?) *nigrocinctus* (square); *Mesobuthus nigrocinctus bishri* subsp. n. (circle).

The interesting point about the new material is the fact that it was collected far from the Lebanon Mountain range, in the Bishri Mountains which are located in eastern part of Syria. The populations from Bishri Mountains and Lebanon Mountains apparently are totally isolated by a large and dry region now occupied by the desert. Moreover, the typical *M. nigrocinctus* population seems to be an element of a mesic environment in the Lebanon Mountain range, with possible extensions in Turkish mountains (Fet *et al.*, 2000; Karataş, 2007). In account of some minor morphological differences and of the disrupted distribution presented by the two populations, a new subspecies is proposed to accommodate the population from Bishri Mountains in East of Syria. Further investigations are necessary to bring some more final conclusions, but in account of the political situation in this region of Syria this step seems impossible, at least for the moment.

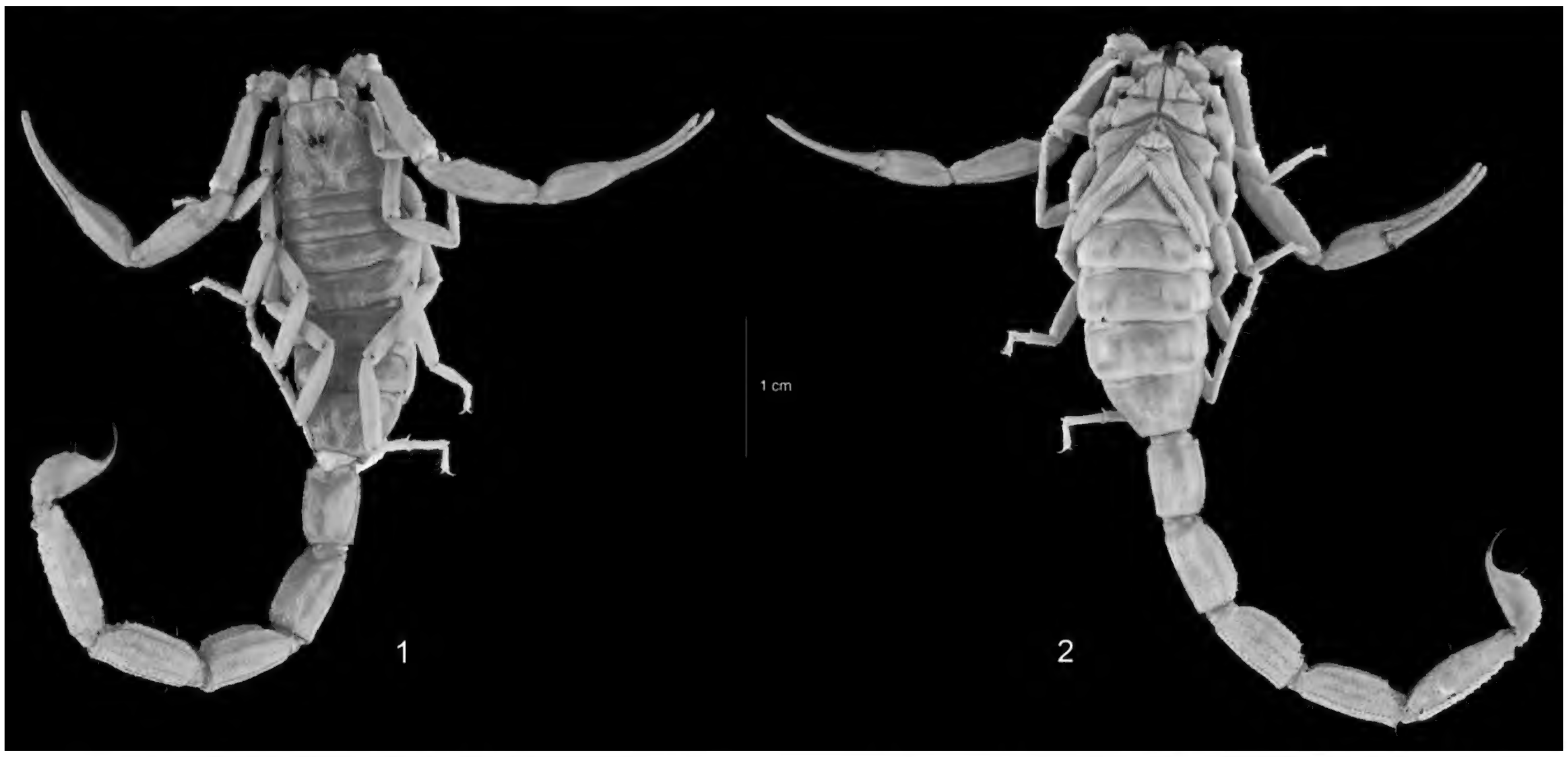
Methods

Illustrations and measurements were made with the aid of a Wild M5 stereo-microscope with a drawing tube (camera lucida) and an ocular micrometer. Measurements follow Stahnke (1970) and are given in mm. Trichobothrial notations follow Vachon (1974) and morphological terminology mostly follows Vachon (1952) and Hjelle (1990).

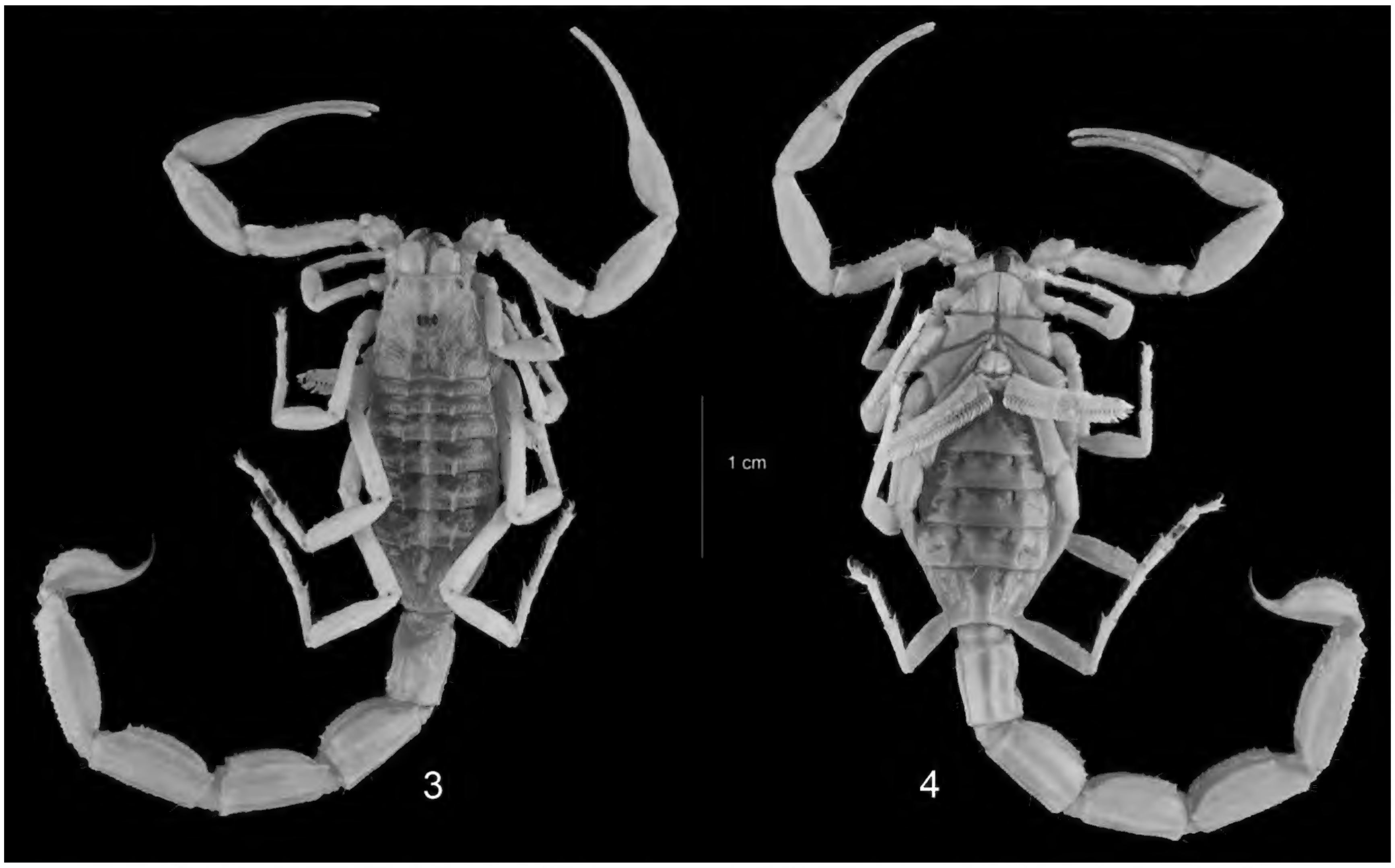
Taxonomic treatment

Family **Buthidae** C.L. Koch, 1837
Genus ***Mesobuthus*** Vachon, 1950 (*Aegaeobuthus*? Kovařík, 2019)

Mesobuthus* (*Aegaeobuthus*?) *nigrocinctus (Ehrenberg, 1828) – (Figs. 1-2)
Comparative material: Lebanon, near to Beirut, Djebel el Gharbi Mountains (Mt. Lebanon), 1900 m, 3/VI/1995 (W. Bischoff). 1 male deposited in the Muséum national d'Histoire naturelle, Paris.



Figs. 1-2. *Mesobuthus* (*Aegaeobuthus*?) *nigrocinctus* (Ehrenberg, 1828). Male from Djebel el Gharbi Mountains (Mt. Lebanon). Habitus, dorsal and ventral aspects.



Figs. 3-4. *Mesobuthus* (*Aegaeobuthus*?) *nigrocinctus bishri* subsp. n. Male holotype. Habitus, dorsal and ventral aspects.

Mesobuthus* (*Aegaeobuthus*?) *nigrocinctus bishri subsp. n. – (Figs. 3-4, 5-13)
Syria, Bishri Mountains, 720 m, (P. Pallary), 1929 (entry on the collections in 1930). 1 male holotype, 2 males and 5 females paratypes. Deposited in the Muséum national d'Histoire naturelle, Paris (RS-2300).

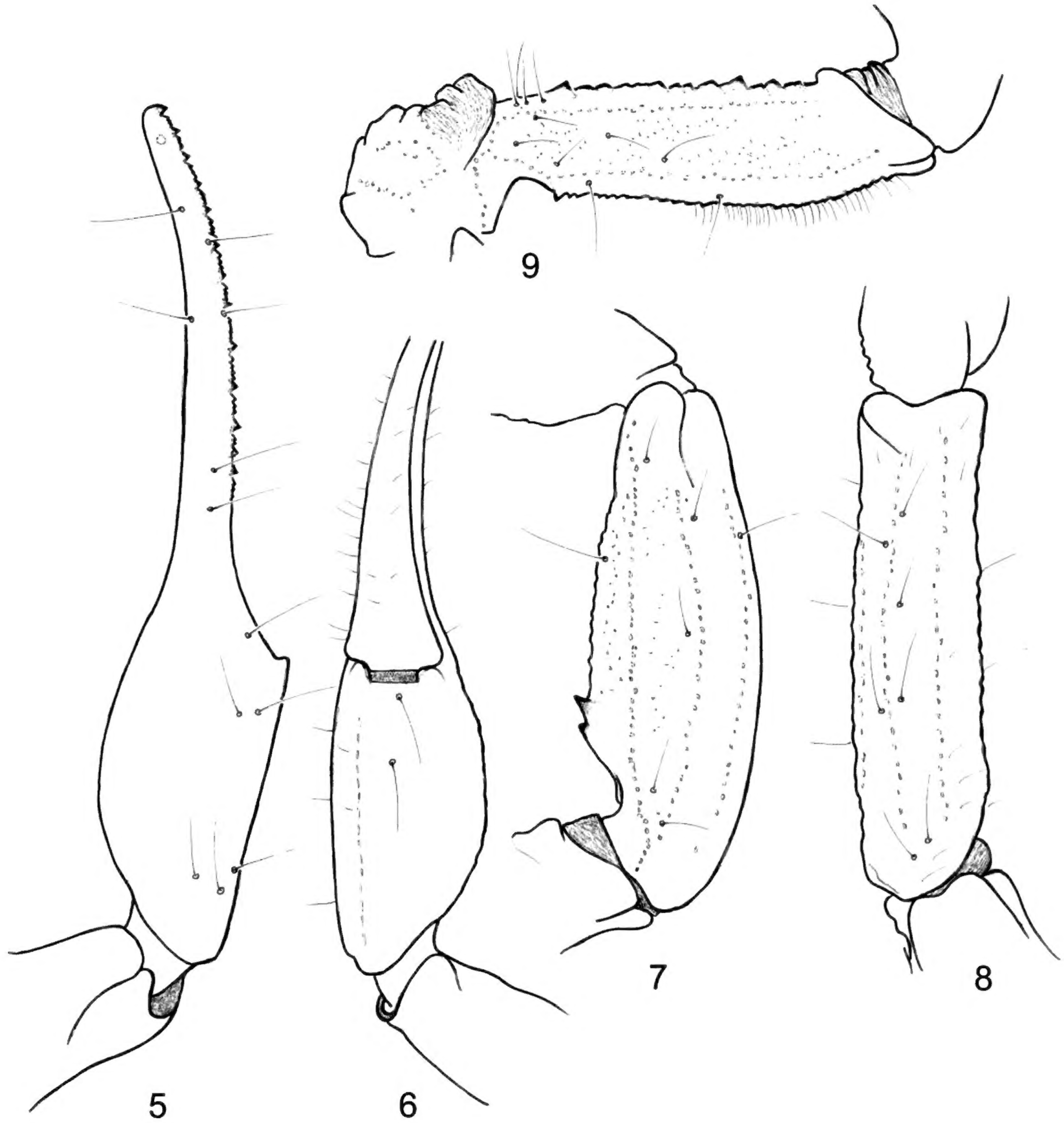
Etymology: The sub-specific name is placed in apposition to the generic name and refers to the geographic region, Bishri Mountains where the new subspecies was found.

Diagnosis: Scorpion of moderate to large size in relation to the species of the genus, reaching a total length of 64.7 and 64.2 mm in male and female respectively. General colouration yellow to pale yellow with some marbled zones over carapace and tergites, better marked on juveniles. Carapace with the anterior margin slightly emarginated, almost straight; carinae moderately marked on carapace and pedipalps; strongly marked on tergites and metasomal segments; tergal carinae better marked on male; metasomal carinae better marked on female; segment V with latero-ventral carinae moderately to weakly lobate and with three to four lateral lobes; general granulations moderately marked. Fixed and movable fingers with 12-12, 12-13 and 13-13 rows of granules in both sexes. Pectines with 25 to 29 teeth in males and 19 to 23 in females. Trichobothrial pattern A-**β** (beta), orthobothriotaxic. Tibial spurs strongly developed.

Relationships: The new subspecies proposed here as *Mesobuthus* (*Aegaeobuthus*?) *nigrocinctus bishri* subsp. n., certainly presents many characters in common with the typical species *Mesobuthus* (*Aegaeobuthus*?) *nigrocinctus* described from the 'mountains near Beirut in Lebanon. The original holotype is however a juvenile specimen and the present study of an adult male from the typical locality brings further evidence about a number of morphological differences presented by the elements of the two populations which can be distinguished as follows: (i) a similar global size with however some distinct morphometric values (see measurements); *Mesobuthus* (*Aegaeobuthus*?) typicus shows a slender body, (ii) a paler yellow colouration with very limited pigmented zones in the individuals of Mt. Bishri; to note that although the material is old it was quite well preserved in ethanol, (iii) carinae on tergites better marked on males of the Bishri population, (iv) in the new subspecies, latero-ventral carinae of metasomal segment V show less conspicuous lobes and better marked intermediate carinae on metasomal segments III and IV. Moreover, both populations inhabit mesic mountain environments which are isolated by a strongly arid region, supposing an isolation process since at least the early Pleistocene (see biogeographic comments).

Description based on male holotype and on paratypes. Measurements after the description.

Colouration basically yellow to pale yellow with some marbled zones on carapace and tergites. Prosoma: carapace yellow with reddish carinae; eyes marked by dark pigment. Mesosoma yellow with inconspicuous marbled zones on carinae, better visible on juveniles. Metasomal segments yellow to pale yellow with some carinae slightly reddish; vesicle pale yellow with reddish zones laterally and ventrally; aculeus yellow at its base and dark red at its extremity. Venter globally yellow to pale yellow; pectines and genital operculum paler than the rest of the ventral surface. Chelicerae pale yellow without any spot; fingers yellow with dark reddish teeth. Pedipalps yellow with rows of granules in fingers reddish. Legs pale yellow.



Figs. 5-9. *Mesobuthus* (*Aegaeobuthus*?) *nigrocinctus bishri* subsp. n. Male holotype. Trichobothrial pattern. 5-6. Chela, dorso-external and ventral aspects. 7-8. Patella, dorsal and external aspects. 9. Femur, dorsal aspect.

Morphology. Carapace moderately granular; anterior margin with a weak concavity, almost straight. Carinae moderately marked; anterior median moderate to strongly granular, central median and posterior median carinae moderately granular; 'lyre' configuration inconspicuous; carinae better marked on female. All furrows moderate. Median ocular tubercle almost in the centre of carapace. Eyes separated by more than one ocular diameter. Three to four pairs of lateral eyes of moderate size in relation to median eyes; fourth pair reduced. Sternum triangular, not narrowed and wider than long. Mesosomal tergites moderately to weakly granular. Three longitudinal carinae moderately to strongly crenulate in all tergites; lateral carinae not reduced in tergites I and II. Tergite VII pentacarinate. Venter: genital operculum divided longitudinally, which plate with a semi-oval shape. Pectines: pectinal tooth count 28-29 in male holotype (see diagnosis for variation); middle basal lamella of the pectines not dilated. Sternites without granules, smooth with moderately elongated spiracles; four carinae on sternite VII, better marked on female; other sternites acarinated and with two weak to moderate furrows. Metasomal segments with a weak to moderate setation; segments I to IV with ten

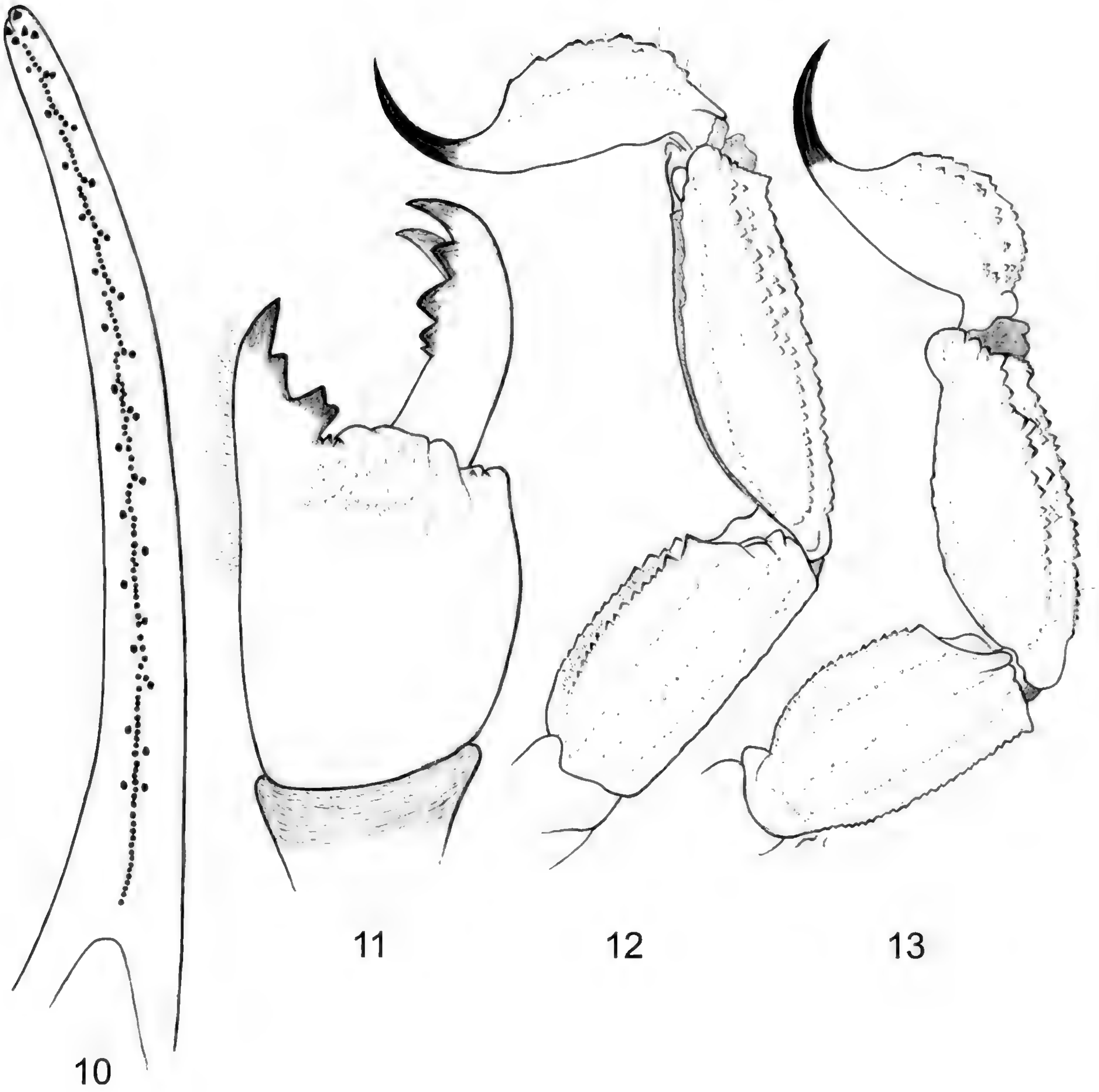
moderately crenulated carinae; intermediate carinae complete on segment III and almost complete on segment IV; ventral carinae moderately marked on segments II-IV; dorsal carinae on segments I to IV with some spinoid granules; segment V with five carinae; the latero-ventral carinae crenulate with a few lobate denticles posteriorly; ventral median carina only slightly divided posteriorly over 1/6 of the segment length; anal arc composed of 11-13 ventral teeth, and 3-4 lateral lobes. All segments with weakly granulated dorsal depression. Intercarinal spaces weakly granular. Telson with some strong granulations ventrally and laterally; aculeus moderately curved and shorter than the vesicle, without a subaculear tubercle. Cheliceral dentition as defined by Vachon (1963) for the family Buthidae; external distal and internal distal teeth approximately the same length; basal teeth on movable finger strong and not fused; ventral aspect of both fingers and manus covered with long dense setae. Pedipalps with a weak setation; femur pentacarinate; patella with 7-8 carinae, moderately marked; all faces weakly granular to smooth; chela almost smooth, with vestigial carinae. Fixed and movable fingers with 12-12 (12-13, 13-13) oblique rows of granules in both sexes. Internal and external accessory granules present, moderate; four accessory granules on the distal end of the movable finger next to the terminal denticle. Chela of male with a weak scalloping of the proximal dentate margin of fixed finger; inconspicuous in female. Legs: tarsus with two longitudinal rows of spiniform setae ventrally; tibial spurs strong on legs III and IV; pedal spurs strong on legs I to IV. Trichobothriotaxy: trichobothrial pattern of Type A, orthobothriotaxic as defined by Vachon (1974). Dorsal trichobothria of femur arranged in **β** (beta) configuration (Vachon, 1975).

Morphometric values of the male holotype and female paratype of *Mesobuthus* (*Aegaeobuthus*?) *nigrocinctus bishri* subsp. n. and those of a male topotype of *Mesobuthus* (*Aegaeobuthus*?) *nigrocinctus*.

Total length including the telson 64.7/64.2/69.1. Carapace: length 6.7/7.0/7.1, anterior width 4.5/4.6/4.4, posterior width 7.2/8.2/7.2. Mesosomal length: 14.8/19.2/17.8. Metasomal segments: I length, 5.5/4.7/5.7, width 4.1/4.4/3.8; II length 6.3/5.3/6.5, width 4.0/4.2/3.7; III length 6.8/5.8/7.0, width 4.0/4.1/3.6; IV length 8.0/6.4/8.0, width 3.8/3.9/3.4; V length 9.2/8.2/9.2, width 3.3/3.7/3.2, depth 3.2/3.5/3.0. Telson length 7.4/7.6/7.8, vesicle: width 3.0/3.2/2.9, depth 2.8/3.0/2.8. Pedipalp: femur length 6.9/6.3/7.3, width 1.8/2.0/1.7; patella length 8.2/7.6/8.6, width 2.5/2.6/2.4; chela length 13.3/12.4/13.7, width 2.4/2.2/2.2, depth 2.4/2.2/2.1; movable finger length 8.4/8.5/8.7.

Biogeographic considerations

Aridification of the Syrian Desert is in general considered as an old process. According to Avni (2008) the continental soil erosion in the arid and semi-arid regions of the Middle East resulted from a long-term natural dynamic change in the soil/rock ratio that evolved within the drainage basins through time. This ongoing process is related to the continuous process of adjustment of the geomorphologic system to the interglacial climate and has been active mainly since the termination of the last glacial phase in the Late Pleistocene. Moreover, during the present Holocene climate, the loss sediments, originally deposited within the drainage basins during the Late Pleistocene glacial phase have being largely removed. This ongoing process causes the degradation of soil and biomass and severely reduces the biotic potential of the region. These parameters indicate that a long-term natural desertification process is ongoing in the arid environment of the Middle East.



Figs. 10-13. *Mesobuthus* (*Aegaeobuthus*?) *nigrocinctus bishri* subsp. n. Male holotype (10-12) and female paratype (13). 10. Cutting edge of movable finger with rows of granules. 11. Chelicera, dorsal aspect. 12-13. Metasomal segments IV-V and telson, lateral aspect.

Also, according to Butzer (1975), the last interglacial period, even if poorly recorded in most areas, experienced environmental conditions similar to those of today; but wherever there is detailed information it becomes equally evident that climates are clearly changed through time. The last glacial allows characterization of at least three distinct palaeoclimatic provinces in the Near East: (i) the highlands of Anatolia, Iran and possibly Lebanon, intensely cold most of the time, were also very dry during the full glacial, stopping the development of any arboreal vegetation, (ii) the Levant, moderately cold and relatively dry in the north, cool and comparatively moist in the south, (iii) Egypt, experiencing long periods of increased rainfall, except for the Würm glacial maximum; a pattern possibly repeated in Sinai and Arabia. The mid-Holocene saw repeated moister trends in Egypt and Arabia, comparable to those in sub-Saharan Africa that affected Israel but are not evident farther north. All of the climatic changes recorded were of relatively short wave length, and none exceeded the duration of the standard late Pleistocene sub stages.

In conclusion, it appears that the process of aridification of the Syrian Desert took place even during relatively recent times partially influenced by the changes in the Sahara

region. This would suggest that the isolation of the *Mesobuthus* (*Aegaeobuthus*?) *nigrocinctus* populations from Mt. Lebanon in Lebanon and that found in the Bishri Mountains in Syria are rather recent.

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***Mesobuthus nigrocinctus bishri* Lourenço, 2020**

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Preliminary study and ecological comments on scorpion diversity in Sidi Bel Abbes region, North-west Algeria

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Abstract

Our work is a recent exploration of North-west of Algeria and a preliminary study on the scorpion fauna of Sidi Bel Abbes region. From different biotopes (Steppe, Forest, and Matorral) and during 12 months of 2019, we sampled 90 specimens of scorpions belonging to 10 species under 3 genera distributed in 2 families. The family Buthidae is represented by *Androctonus aeneas* (relative abundance "RA"= 2.22%), *Buthus boussaadi* (RA= 14.44%), *Buthus oudjanii* (RA= 3.33%), *Buthus paris* (RA= 16.67%), *Buthus pusillus* (RA= 3.33%), *Buthus tunetanus* (RA= 38.89%), and a new *Buthus* species (RA= 6.67%). The family Scorpionidae is represented by *Scorpio maurus* (RA= 8.89%), *Scorpio maurus trarasensis* (RA= 2.22%), and *Scorpio punicus* (RA= 3.33%). Among the important results in this work is a new record of Moroccan scorpion *B. oudjanii* Lourenço, 2017 in Algeria and reporting the presence of two scorpion species *B.*

boussaadi and *B. pusillus* known from the North-east of Algeria. The Shannon's index (H' = 2.67 bits) indicates that Sidi Bel Abbes region has a high level of scorpion diversity and the value of evenness (E = 0.80) reflects the high equilibrium between the effectiveness of sampled species. There is a close affinity between some species and their biotopes such as *A. aeneas* has an affinity to herbaceous habitats, *B. boussaadi* was closely attached to medium altitude (500-800 m) and *B. oudjanii* probably prefers the forest with Mediterranean climate, high altitudes (1600 m) and with common forest species such as *Quercus ilex* and *Pistacia lentiscus*.

Keywords: Scorpion, Biodiversity, Sidi Bel Abbes, Algeria.

Introduction

Since the general contribution of Vachon (1952) and El-Hennawy (1992) on scorpions from North Africa, some new contributions focused on scorpions of Algerian Sahara (Lourenço, 2002; Sadine, 2005; Lourenco & Leguin, 2011; Sadine *et al.*, 2011; Sadine, 2012; Sadine *et al.*, 2014; Lourenço & Sadine, 2014; Lourenço *et al.*, 2015; Lourenço & Rossi, 2015; Lourenço & Sadine, 2015; Sadine *et al.*, 2016; Lourenço *et al.*, 2016; Lourenço *et al.*, 2017a; Lourenço *et al.*, 2017b; Lourenço *et al.*, 2018a; Sadine, 2018; Sadine *et al.*, 2018) and in the North-east of Algeria such as in Batna and M'Sila (Lourenço & Sadine, 2016; Lourenço *et al.*, 2018b). But in North-west Algeria, all works are very old like the note about *Androctonus aeneas* (Koch, 1839) and *Scorpio maurus trarasensis* Bouisset & Larrouy, 1962 in Oran region.

Our work was carried out during 12 months of 2019 in three different biotopes (Steppe, Forest, and Matorral) in Sidi Bel Abbes region, North-west Algeria. This work aims to enrich the existing knowledge on scorpion diversity in this region and to describe the environmental conditions of habitats of each species.

Material and Methods

Study area

Our study area is the region of Sidi Bel Abbes, North-west Algeria (Fig. 1) with climate generally Mediterranean and semi-arid to cool winter (Benyahia *et al.*, 2001). In our study, we have chosen three differentiated stations selected as an altitudinal gradient and the homogeneity of the plant cover (according to the abundance and dominance of plant species). The characteristics of these stations are shown in Table (1).

Sampling and identification of scorpion

Specimens of scorpions were collected from three stations (Ras Elma, Merine, and Tessala) in Sidi Bel Abbes (North-west Algeria). In this study, only adult individuals are used for identification, after being killed and kept in 70% alcohol. Identification was obtained using a stereo-microscope as described by Vachon (1974). Material is deposited in Laboratory of Zoology, University of Ghardaïa, Algeria.

Data Analysis

In our survey we used some ecological indices as:

The species richness (S): to explain the composition of the scorpion fauna, the relative abundance (RA %): determined as the ratio of the number of individuals for each species divided over the total number of individuals recorded (90), the diversity of scorpion fauna

was evaluated by Shannon's index **(H'):** H'= - ∑ pi X Log_2pi), and Evenness (E): (E= H'/log_2S) based on the relative density pi of the "i" species (Magurran, 2004).

Fig. 1. Map of Algeria, showing our study area (Sidi Bel Abbes).

Table 1. Characteristics of the sampled stations.

Station	Bioclimate	Altitude (m)	Biotope	Flora (Ouici *et al.*, 2015)	Soil typology (Baroudi *et al.*, 2011)
Ras Elma	Semi-Arid	1000-1400	Steppe	*Stipa tenacissima* L. *Artemisia herba-alba* Asso *Peganum harmala* L. *Atriplex halimus* L.	Brown calcareous soils, Sandy clay.
Merine	Semi-Arid	900-1370	Forest	*Pinus halepensis* Miller *Tetraclinis articulata* (Vahl) Mast. *Quercus ilex* L. *Quercus coccifera* L. *Pistacia lentiscus* L.	Reddish brown calcareous soils and Red sandy soils.
Tessala	Sub-humid	720-1000	Matorral	*Calicotome villosa* (Poir.) Link *Chamaerops humilis* L. *Thymus vulgaris* L. *Cistus albidus* L.	Raw mineral soils: lithosols and regosols. Some rendzinas.

Results and Discussion

The relative abundance (RA) of scorpions

During 12 months of 2019, we have collected and examined 90 scorpions from Sidi Bel Abbes region (North-west Algeria). Based on morphological and morphometric criteria, we have identified 10 species that belong to two families (Table 2).

Among the 90 individuals, we note the dominance of genus *Buthus* (83.33%) with 6 different species. In specific abundance, *B. tunetanus* (Herbst, 1800) is the most abundant species with a rate of 38.89%. In the second position *B. paris* (C.L. Koch, 1839) and *B. boussaadi* Lourenço, Chichi & Sadine, 2018 have close ratios 16.67% and 14.44%, respectively. The two species *Scorpio maurus* Linnaeus, 1758 and *Buthus* sp. are represented by a low percentage 8.89 and 6.67%, respectively. However, the other species *Androctonus aeneas* C.L. Koch, 1839, *B. pusillus* Lourenço, 2013, *B. oudjanii* Lourenço, 2017, *S. punicus* Fet, 2000, and *S. maurus trarasensis* Bouisset & Larrouy, 1962 are represented by very low ratios, lesser than 3.4%.

Table 2. Systematic list and relative abundance of scorpion species captured in Sidi Bel Abbes region (North-west Algeria) during 2019 (RA %).

Family	Genus	Species	ni	AR
Buthidae (**85.55**)	*Androctonus* (**2.22**)	*A. aeneas* C.L. Koch, 1839	2	2.22
	Buthus (**83.33**)	*B. boussaadi* Lourenço, Chichi & Sadine, 2018	13	14.44
		B. oudjanii Lourenço, 2017	3	3.33
		B. paris (C.L. Koch, 1839)	15	16.67
		B. pusillus Lourenço, 2013	3	3.33
		B. tunetanus (Herbst, 1800)	35	**38.89**
		Buthus sp.	6	6.67
Scorpionidae (**14.44**)	*Scorpio* (**14.44**)	*S. maurus* Linnaeus, 1758	8	8.89
		S. m. trarasensis Bouisset & Larrouy, 1962	2	2.22
		S. punicus Fet, 2000	3	3.33
Total	**3 genera**	**10 species**	**90**	

The genus *Buthus* is the most speciose and widespread scorpion in North Africa, with 55 valid named species (Rein, 2020). We noted a very evident diversity of *Buthus* species in our study region (6 species). According to the distribution of this genus in Algeria proposed by Lourenço *et al.* (2018b), we can admit that Sidi Bel Abbes region with its geographical position have assembled various *Buthus* from neighbouring regions such as: *B. paris* and *B. pusillus* form east littoral region, *B. oudjanii* from the far west (Oudjda, Morocco), *B. boussaadi* as steppe species from the south and *B. tunetanus* widespread one in Algeria. In addition, a new *Buthus* is also found and it seems to be endemic for this region (the description of this new species is in print now).

The species *A. aeneas* seems the biggest black scorpion species in Algeria. This species was described in 1839 from Ain El-Turk (Oran) locality not far from our study area (55 km) and according to the distribution of this species proposed by Lourenço *et al.* (2015), its presence in Sidi Bel Abbes region can be with a high ratio.

The genus *Scorpio* is represented by 3 species in our study. *S. maurus* is the most abundant scorpion in Sidi Bel Abbes region. The same was reported in M'Sila region that this species was very abundant (47.9%) (Chichi, 2015). *S. punicus* and *S. m. trarasensis* are represented with a very low ratio respectively 3.33% and 2.22%. If we referred to the

distribution of *S. punicus* in North Africa (Lourenço & Rossi, 2016) this species cannot be found in Sidi Bel Abbes region except as an accidental case. *S. m. trarasensis*, a rare sub-species, was described from Msirda Fouaga (Tlemcen) situated in less than 115 km in the west of our study area (Bouisset & Larrouy, 1962).

Diversity and scorpion structure

The result of Shannon's index (H') and evenness (E) for this region are summarized in Table (3).

Table 3. Shannon's index (H') and evenness (E) of scorpion fauna of Sidi Bel Abbes region.

Station	Biotope	N	S (species)	H' (Bits)	log_2S	E
Ras elma	Steppe	10	4	1.85	2.00	0.92
Merine	Forest	40	8	2.54	3.00	0.85
Tessala	Matorral	40	4	1.82	2.00	0.91
Total		**90**	**10**	**2.67**	**3.32**	**0.80**

The value of Shannon's index (H') of the Sidi Bel Abbes region is estimated with 2.67 bits, indicating that this region has a high level of scorpion diversity and the value of evenness (E) equals 0.80 reflecting the high equilibrium between the effectiveness of sampled species. Nevertheless, between biotopes, we can note that steppe and Matorral are poor with only 4 species and H' attain respectively 1.85 bits and 1.82 bits. On the contrary, the value of this index in forest ecosystem (H'= 2.54 bits) showing an important scorpion diversity in this biotope (intermediate altitudes). El Hidan *et al.* (2019) at local scale, confirmed the highest richness and abundance might not be found at the lowest but at intermediate altitudes.

Concerning the values of evenness in these three biotopes are more than 0.8 which indicate a balance between the numbers of sampled scorpion populations in these biotopes.

Spatial distribution and ecological comments

Scorpions are very attached to preferential biotopes (Vachon, 1952). Many environmental factors can influence the diversity and abundance of scorpions in most ecosystems, such as the soil type, topography, hydrology, food resources, and especially, temperature and precipitation (Polis, 1990; Prendini, 2005; Dias *et al.*, 2006; Araújo *et al.*, 2010; Sadine *et al.*, 2012; Nime *et al.*, 2013, 2014; Pizarro-Araya *et al.*, 2014). Also, Sadine (2018) mentioned that there is a close affinity between species and their biotopes. In this context we have summarized the distribution of scorpion species in the three stations in Fig. (2).

The Merine station as forest is the richest on scorpion species (8, divided to 3 genera). In the second position the station of Tessala (Matorral) with 5 species belonging to one genus (*Buthus*). Ras Elma ranked as poor station with 4 species and 3 genera.

A. aeneas was revised by Lourenço *et al.* (2015) based on neotype from Ain El-Turk (55 km far from our study area). This species was found in steppe and forest biotopes between 1000-1400 metres of altitude. Where the herbaceous layer is dominant: *Artemisia herba-alba*, *Atriplex halimus*, *Peganum harmala*, and *Stipa tenacissima* in Ras-Ema station and some trees of *Pinus halepensis*, *Quercus ilex*, and *Pistacia lentiscus* covering less than 50% of stony soil. According to Sadine *et al.* (2012) the abundance of

this species is negatively correlated with the dense forest vegetation, but also with altitude that determines the climatic conditions of the site. Indeed, Vachon (1952) captured individuals in region with sparse rangeland-floristic compositions. In the Algerian Sahara, *A. aeneas* was found in specific Reg or plain lands with a stony bottom (Sadine *et al.*, 2011).

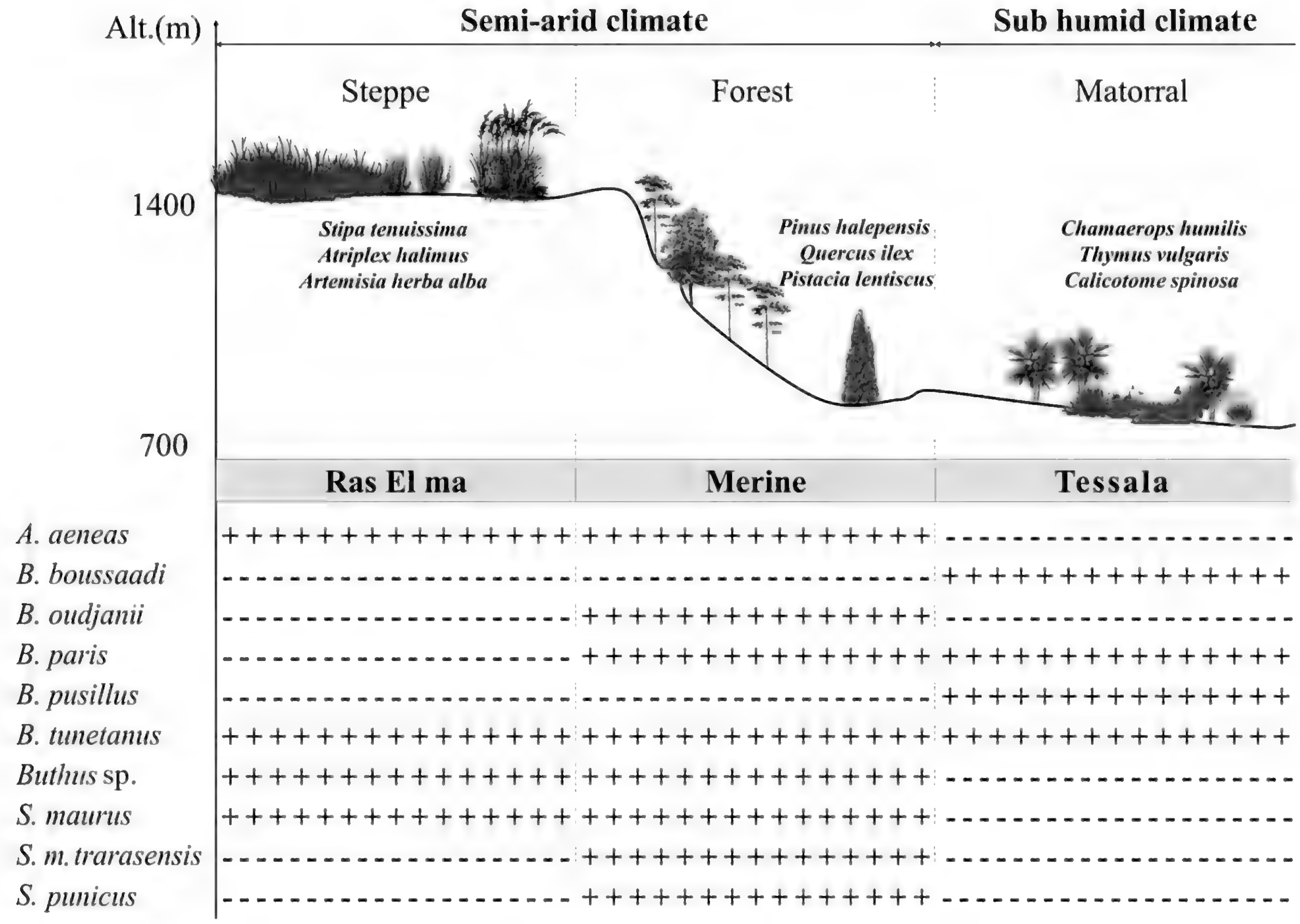

Fig. 2. Schema of spatial distribution of different species.

In addition, *A. aeneas* has an affinity to herbaceous habitats more or less warm in south aspects of the National Park of Belezma, Northeast Algeria (Sadine *et al.*, 2012) and all other locations cited in Vachon (1952) as: Laghouat (Messaad and Taguine) and Biskra (Ouled Djellal) are situated in semi-arid climate. That can justify nonexistence in Tessala (Sub-humid climate).

B. boussaadi is a recent identified species, its affinity is not clear except it can be a possible case of vicariance between this species and other population of *Buthus saharicus* Sadine, Bissati & Lourenço, 2016 (desert species). In our study *B. boussaadi* was collected only in Tessala station. In account of the climate differences observed between Bou Sâada (Type locality of *B. boussadi*) as semi-arid climate and Tessala station (sub-humid) it is not possible, but if we suggest the altitude parameter, it is strongly accepted with altitudes ranging from 540 to 800 m (Chichi, 2015). Because, environmental variables that change with altitude may have an effect on community composition and distribution (Brown, 1995; Campón *et al.*, 2014; El Hidan *et al.*, 2019).

In our study, we note a new record of *B. oudjanii* in Algeria, exactly in the forest of Merine, in the same forest formations of type locality Tafoughalt (North-east of Morocco) (Lourenço, 2017). This region is characterized by Mediterranean climate and

the forest formations are situated at altitudes between 900 to 1600 m with common forest species such as *Quercus ilex* and *Pistacia lentiscus* (Acherkouk *et al.*, 2011).

The species *B. paris* was sampled form two stations: Merine and Tessala, but with a great number in the Matorral ecosystem (9 specimens). This species was recorded in several works as littoral scorpion in North east Algeria (Vachon, 1952; Lourenço, 2013; Sadine *et al.*, 2016; Lourenço & Sadine, 2016; Lourenço *et al.*, 2018b) and Oudjda in North east Morocco (Vachon, 1952).

B. pusillus was described form region of Tizi Oumalou in the Djurdjuna Mountains at altitude 2150 m. However, in our survey, this species is ranked as rare scorpion. It was sampled only in Matorral ecosystem (Tessala station) in low altitudes average 700 m. Showing that the biotope affinity of *B. pusillus* remains not clear or discreet.

The species *B. tunetanus* is the most abundant species (38.89%); it was collected from all studied biotopes. This species was mentioned in Morocco, Algeria, Tunisia and Libya (Sousa *et al.*, 2017), occurring from Tunisia to Morocco in the central horizontal band between 31°N to 35°N (Vachon, 1952; Sadine *et al.*, 2012; Lourenço, 2013; Sadine *et al.*, 2016; Lourenço & Sadine, 2016; Lourenço *et al.*, 2018b).

The new species of *Buthus* shows an affinity to semi-arid climate, relatively high altitude (Ras Elma and Merine) and sandy soils.

S. maurus ranked the most abundant *Scorpio* with 8.89%. It was sampled from Ras Elma and Merine with high altitude and an abundance of trees and herbaceous vegetation. Abdel-Nabi *et al.* (2004) indicated that *S. maurus palmatus*, a subspecies of this species is known to be able to live at high altitude. However, Sadine *et al.* (2012) in National Park of Belezma (Batna) reported that this species was recorded in medium elevation (900-1100 m) with herbaceous vegetation cover more than 50%.

S. punicus and *S. m. trarasensis* are found only in Merine forest with reddish brown calcareous soils and red sandy soils. This soil (substratum) characteristic seems preferable to the borrowing scorpion (Vachon & Kinzelbach, 1987; Amr & Abu Baker, 2004). *S. punicus* with its wide distribution in North Africa (Lourenço & Rossi, 2016), in Algerian septentrional Sahara, it is ranked as hygrophilic and ombrophilic species found in the Palm grove and the Sebkha with low altitude (Sadine, 2018). However, information about *S. m. trarasensis* seems rare, except, the characteristics of type locality M'Sirda Fouaga (Tlemcen) region border the coastline is situated at altitude between 400-600 m (Bouisset & Larrouy, 1962).

Conclusion

The present paper is a preliminary study on the scorpion fauna north-west Algeria. Dispute the relatively small area surveyed in the Sidi Bel Abbes region, we were able to identify 10 species, with a major dominances of *B. tunetanus*. The other species are placed as accidental to very accidental species with an occurrence of less than 10% (Magurran, 2004). According to the values of Shannon's index (2.67 bits) and evenness (0.80) this region has a high level of scorpion diversity and a high equilibrium between the effectiveness of sampled species. Among the six *Buthus* species, we note a new record of Moroccan scorpion *B. oudjanii* in Algeria and the expansion of the geographical distribution of some scorpion species from the north-east of the country to reach this region in the north-west such as: *B. bou*ssaadi and *B. pusillus*.

In conclusion, many scorpion species show a close affinity between scorpions and their biotopes, for example: *A. aeneas* has an affinity to herbaceous habitats, *B. boussaadi* was closely attached to medium altitude (500-800 m) and *B. oudjanii* prefer probably the

forest with Mediterranean climate, high altitudes and with common forest species such as *Quercus ilex* and *Pistacia lentiscus*. However, for other species the biotope affinity remains not clear or discreet such as *B. pusillus* and *S. punicus*.

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First record of the spiders *Neoscona usbonga* Barrion & Litsinger, 1995 and *Hamataliwa pentagona* Tang & Li, 2012 (Araneae: Araneidae & Oxyopidae) from India

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Abstract

Neoscona usbonga Barrion & Litsinger, 1995 (Araneidae) and *Hamataliwa pentagona* Tang & Li, 2012 (Oxyopidae) are recorded for the first time in India. Diagnoses and images of the two species are provided.

Keywords: Spiders, *Neoscona*, *Hamataliwa*, Wayanad, India.

Introduction

Neoscona usbonga Barrion & Litsinger, 1995 and *Hamataliwa pentagona* Tang & Li, 2012 are newly recorded for Indian spider fauna. Members of *Neoscona* Simon, 1864 are common and abundant orb weavers, encountered in different ecosystems throughout the world (Barrion & Litsinger, 1995). One hundred and sixteen species of the genus *Neoscona* were reported worldwide among which only twenty six species are distributed in India (World Spider Catalog, 2019). *Hamataliwa* Keyserling, 1887 is the second largest genus of the family Oxyopidae, and currently contains 83 species (World Spider Catalog, 2019) with so far five species are reported from India. *Hamataliwa pentagona* is the sixth Indian species of this genus.

Material and Methods

Specimens collected from Kareem forest Kasargod, Kerala, India by hand picking and sweeping were preserved in 70% alcohol. Well-known keys (Barrion & Litsinger,

1995; Tang & Li, 2012) were followed for identification. Observations were made using a Leica EZ4HD stereomicroscope. Photographs were taken with a digital camera attached to Leica DFC 290 stereomicroscope. Specimens are deposited at the Western Ghats Regional Centre, Zoological Survey of India, Kozhikode, Kerala, India.

Results

Family **Araneidae** Clerck, 1757
Genus ***Neoscona*** Simon, 1864
Neoscona usbonga Barrion & Litsinger, 1995 (Plate Ia-e)

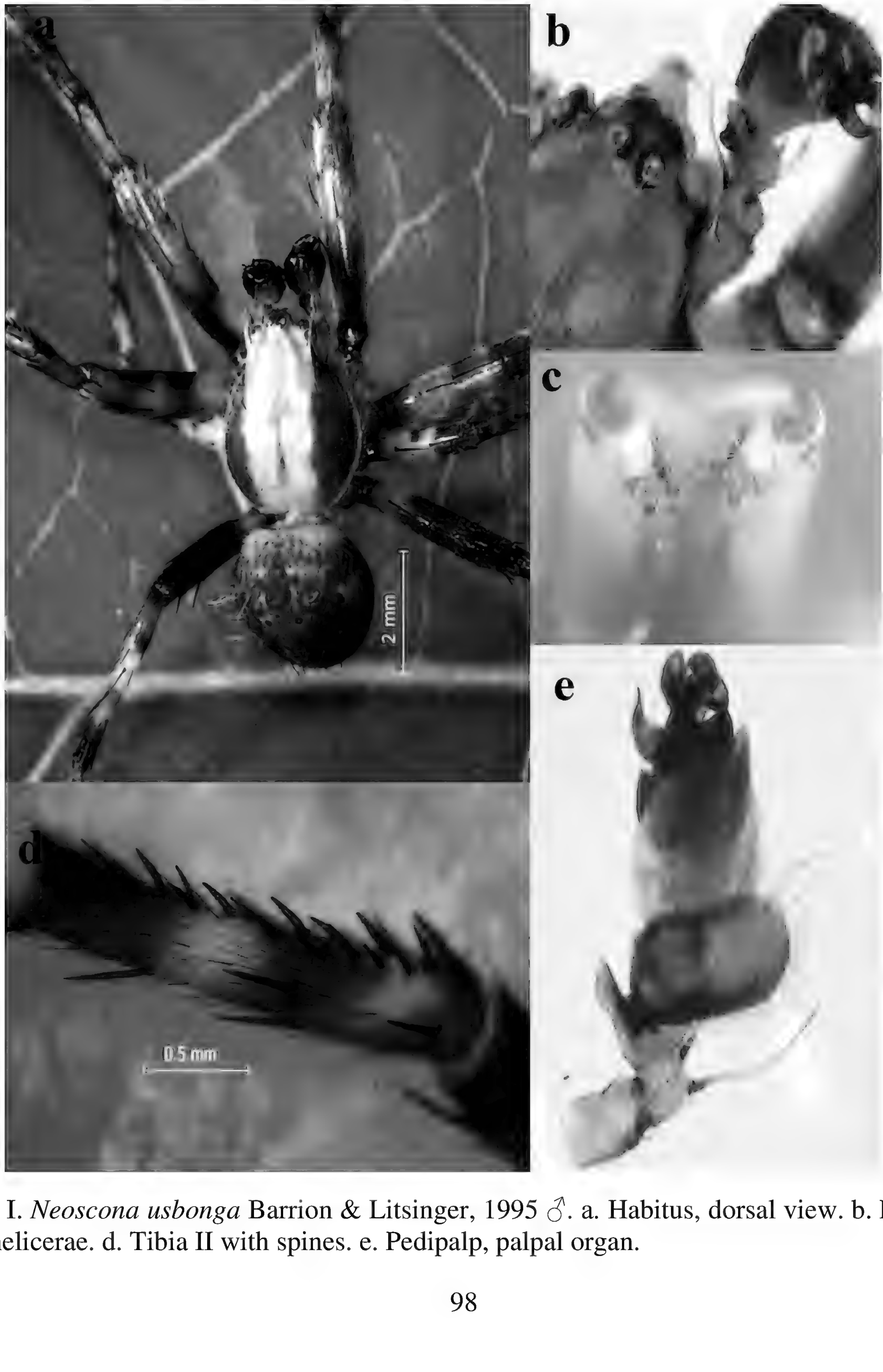

Plate I. *Neoscona usbonga* Barrion & Litsinger, 1995 ♂. a. Habitus, dorsal view. b. Eyes. c. Chelicerae. d. Tibia II with spines. e. Pedipalp, palpal organ.

Diagnosis

Posterolaterals of posterior lateral eyes bear four long spines (Plate Ib). Chelicerae: promargin with five teeth and retromargin with two teeth in right chelicera and three in the left one (Plate Ic). Tibia II with 58 peg-like spines pro-lateroventrally in left leg and five strong dorsal spines (Plate Id). Pedipalp brown, with reddish brown cymbium; paracymbium inverted sigmoid shape dorsally (Plate Ie).

Material examined. One male, Kareem forest, Kasargod, Kerala, India, 01.10.2017. Coll. P.K. Asalatha.

Distribution. Philippines (Barrion & Litsinger, 1995), India (New record): Kerala.

Host plant: Not known.

Family **Oxyopidae** Thorell, 1870

Genus ***Hamataliwa*** Keyserling, 1887

Hamataliwa pentagona Tang & Li, 2012 (Plate IIa-d)

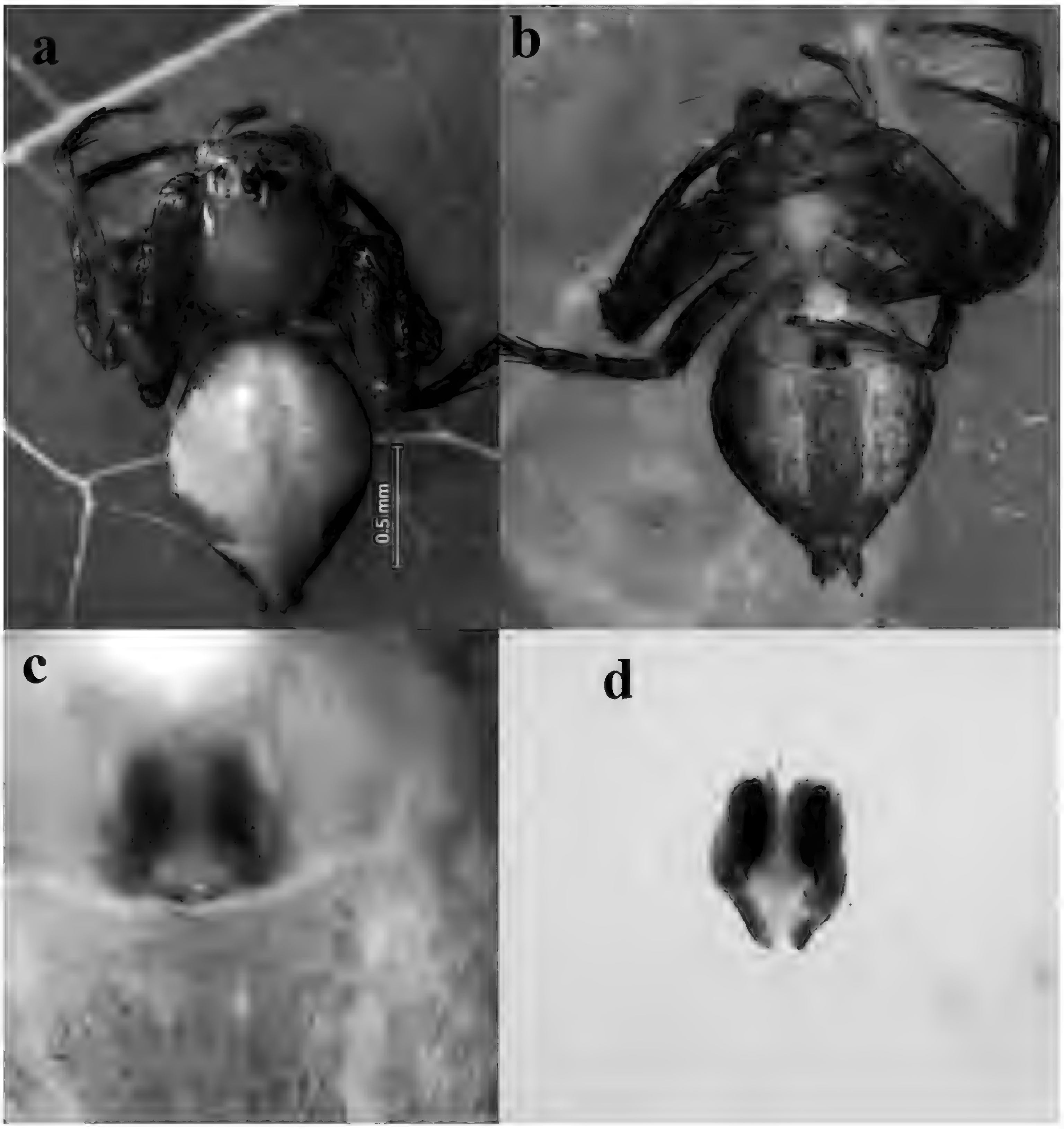

Plate II. *Hamataliwa pentagona* Tang & Li, 2012 ♀. a-b. Habitus. a. dorsal view. b. ventral view. c-d. Epigynum. c. ventral view. d. dorsal view.

Diagnosis

Abdomen longer than wide; greyish white with broken greyish white spots and greyish brown markings dorsally; grey ventrally (Plate IIb). Pentagon-shaped atrium of the epigynum; copulatory ducts short, spermatheca large (Plate IIc-d).

Material examined. One female, Kareem forest, Kasargod, Kerala, India, 01.10.2017. Coll. P.K. Asalatha.

Distribution. China (Tang & Li, 2012), India (New record): Kerala.

Host plant: *Chromolaena odorata*.

Acknowledgments

The authors are grateful to the Director, Zoological Survey of India (ZSI), Kolkata and Dr. Sureshan Officer-in-Charge, Western Ghats Regional Centre, ZSI for providing laboratory and library facilities. Thanks are also due to the Kannur University for providing the Junior Research Fellowship to the first author. We would like to express our sincere thanks to the Kerala State Department of Forest and Wildlife for providing permission (WL 10-10883/2017; Dated: 14:03:2017) to carry out the study. Authors are also thankful to Dr. Dhruba Chandra Dhali, Assistant Professor, Shyampur Siddheswari Mahavidyalaya, West Bengal for his support in identifying the specimens.

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Genus *Hogna* Simon, 1885 (Araneae: Lycosidae), a new record to the spider fauna of Iraq

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Abstract

The wolf spider genus *Hogna* Simon, 1885 is recorded in Iraq for the first time. Two females of *Hogna radiata* (Latreille, 1817) were collected from Dhi Qar province, southern Iraq. *Hogna* is the sixth genus of the family Lycosidae and *Hogna radiata* is the 61st species of Araneae recorded in Iraq until now.

Keywords: Wolf spider, *Hogna radiata*, First record, Dhi Qar, Iraq.

Introduction

Lycosidae is the sixth largest spider family in the world, with 2439 species described within 125 genera worldwide. Genus *Hogna* Simon, 1885 is one of the most species-rich genera and the second largest genus, after *Pardosa* of the family Lycosidae, represented by 233 species and 4 subspecies distributed almost all over the world except Antarctica (World Spider Catalog, 2020). Within this genus, the species *H. radiata* (Latreille, 1817) is recorded in two of the countries neighbouring Iraq, *i.e.* Iran and Turkey (Zamani *et al.*, 2020).

According to the latest data about spider fauna of Iraq by Fomichev *et al.* (2018), there are five genera and nine species of family Lycosidae: *Alopecosa albofasciata* (Brullé, 1832), *Arctosa cinerea* (Fabricius, 1777), *A. tbilisiensis* Mcheidze, 1946, *Hippasa pisaurina* Pocock, 1900, *Pardosa aenigmatica* Tongiorgi, 1966, *P. cribrata* Simon, 1876, *Pardosa morosa* (L. Koch, 1870), *P. proxima* (C.L. Koch, 1847), and *Wadicosa fidelis* (O. Pickard-Cambridge, 1872).

It is expected to find many other species of Lycosidae in Iraq due to the fact that many regions and provinces of Iraq are still not studied at all and therefore any material

collected from those regions are expected to include a new records of spider species and genera.

Hogna radiata is the 10th lycosid and the 61st spider species recorded in Iraq until now after the recent records of the gnaphosid genus *Gnaphosa* by Al-Khazali & Hussein (2019), the species *Tetragnatha nitens* (Savigny, 1825) by Najim (2019), and other published papers including new records of spider species in Iraq after the work of Fomichev *et al.* (2018).

Two female specimens were collected in December from one of the plantations in Al-Shatrah district north of Dhi Qar province (Fig. 1). The specimens were preserved in 75% ethanol. Specimens were examined by a Nikon camera connected on dissecting microscopes. Identification of specimens depended on comparison with figures of Brady (2012) and Trotta (2005). The measurements of legs are provided as full length (femur, patella, tibia, metatarsus, and tarsus). All measurements are in millimetres.

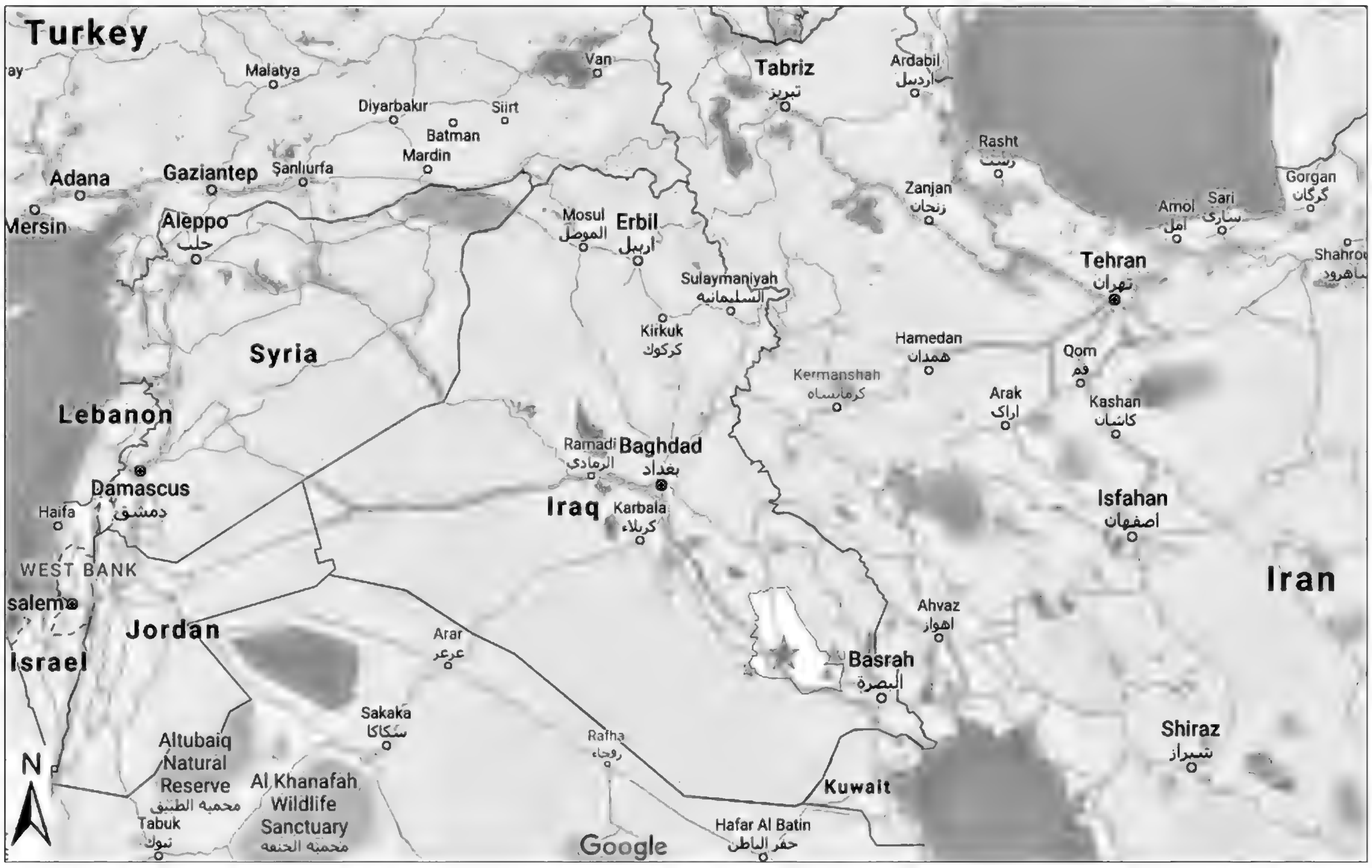

Fig. 1. Map of Iraq showing collecting locality of specimens (star) in Dhi Qar province.

Taxonomy

Family **Lycosidae** Sundevall, 1833
Genus ***Hogna*** Simon, 1885
Diagnosis: see Brady (2012: 206)

Hogna radiata (Latreille, 1817) (Figs. 2-3)
Hogna radiata Trotta, 2005: 169, f. 351-352 (♂♀).
Hogna radiata Brady, 2012: 205, f. 34-39, 45 (♂♀).

Material examined. 2♀♀, Iraq: Dhi Qar Province, Al-Shatrah district (31°24'30.17"N, 46°10'32.45"E), 28.Aug.2018.

Fig. 2. *Hogna radiata* (Latreille, 1817) ♀. Habitus, dorsal view.

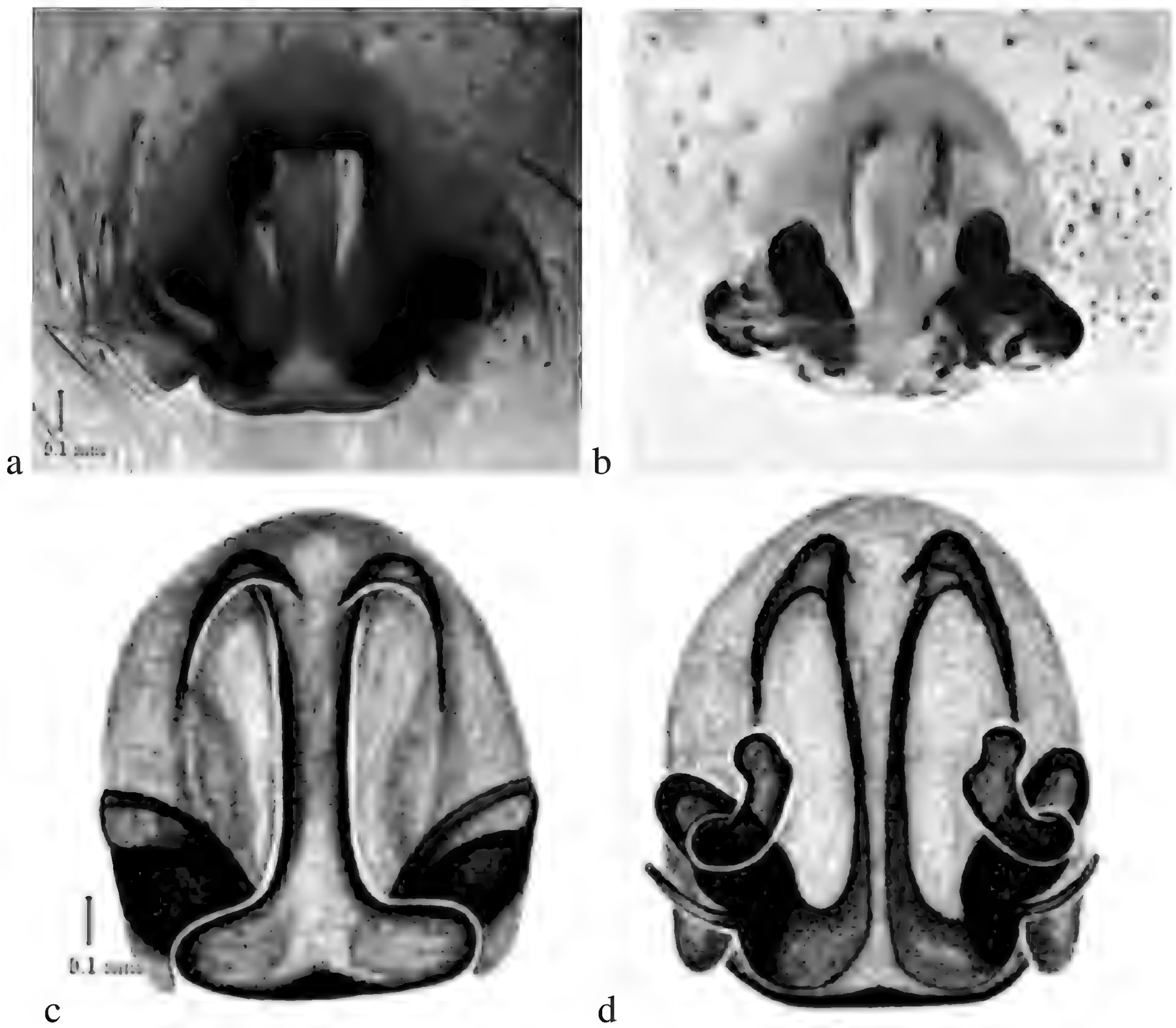

Fig. 3. *Hogna radiata* (Latreille, 1817) ♀. a,c. Epigynum, ventral view. b,d. Vulvae, dorsal view. [c-d. after Brady (2012: f. 38-39) for comparison]

Description of female. General appearance and colouration as in Fig. (2). Measurements: Body length 14.3; Carapace length 6.8; Carapace width 3.1; Abdomen length 7.5; Abdomen width 5.1; Leg I 14.1 (1.6, 2.2, 2.8, 2.7, 4.8), Leg II 13.4 (1.4, 2.3, 2.9, 2.5, 4.6), Leg III 12.4 (3.1, 1.3, 3.3, 3.1, 1.6), Leg IV 16.9 (5.4, 2.0, 3.4, 1.6, 2.4). Epigynum as in Fig. (3a), with two longitudinal openings separated by median septum in form of inverted "T", the longitudinal piece is longer than the transverse piece and vulvae as in Fig. (3b).

Global distribution. *H. radiata* is widely distributed in the world: Europe, Turkey, Caucasus, Russia (Europe to South Siberia), Kazakhstan, Iran, Central Asia (World Spider Catalog, 2020), North Africa (Nentwig *et al.*, 2020), and Iraq (current paper).

Comment: *Hogna radiata* is recorded in two of Iraq's neighbouring countries, Iran and Turkey, thus it was expected to be present in one of the southern Iraqi provinces close to Iran.

Acknowledgment

My thanks and gratitude to Hisham K. El-Hennawy (Egypt) for providing scientific advice and observations concerning identification of the species.

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Serket (2020) vol. 17(2): 105-109.

First report of *Philodromus dispar* Walckenaer, 1826 (Araneae: Philodromidae) in Turkey

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Abstract

Here, the philodromid species *Philodromus dispar* Walckenaer, 1826 is reported for the first time from Turkey. In addition, detailed descriptions of both male and female samples are provided.

Keywords: Araneae, Philodromidae, *Philodromus dispar*, new report, Turkey.

Introduction

Philodromidae is a medium sized entelegyne spider family comprising a world fauna of 538 species in 31 genera (World Spider Catalog, 2020). Spiders of family Philodromidae have eight eyes and their legs are laterigrade and slender with two tarsal claws, distinct claw tufts, and scopulae. Family Philodromidae is represented by 4 genera (*Philodromus, Pulchellodromus, Thanatus, Tibellus*) and 38 species in Turkey (Danışman *et al.*, 2019). This paper presents the characteristic features and distribution of *Philodromus dispar* Walckenaer, 1826 adding a new species to the araneo-fauna of Turkey. This record increases the total number of philodromid spiders in Turkey to 39 species.

Material and Methods

The specimens were taken by means of a hand aspirator. The identification and photographing of the samples were performed by a Leica DC160 camera attached to a Leica S8AP0 stereomicroscope. Chiefly well known identification keys were used for identification (Heimer & Nentwig, 1991; Roberts, 1995; Lecigne *et al.*, 2019). Images were montaged using "Combine ZM" image stacking software and "Photoshop CS5" image editing software. Measurements are given in millimetres. For scanning electron microscopy (SEM), specimens were dissected and dehydrated in a graded ethanol series (80-100%), critical point dried, and Au coated. SEM micrographs were taken under high vacuum with a JEOL JSM-5600. The studied samples were preserved in 70% ethanol and deposited in the collection of the Arachnological Museum of Kırıkkale University (KUAM).

Results

Philodromus dispar Walckenaer, 1826
Material examined: 2♂♂, Ankara Province, Elmadağ District (39°57'03"N, 33°11'27"E), 16.08.2017, 1163 m. From steppe formation and grass clusters, Leg. T. Danışman. 1♂, 1♀, Kastamonu Province, Pınarbaşı District (41°35'27"N, 33°08'35"E), 08.07.2015, 928 m. From conifers, Leg. T. Danışman.

Distribution: Europe, Caucasus, Russia (Europe to South Siberia), Iran. Introduced to USA, Canada (World Spider Catalog, 2020).

Description:
Male (Figs. 1, 3)**:** Total length 5.2. Prosoma 2.5 long, 2.4 wide. Abdomen 2.7 long, 1.3 wide. Prosoma yellowish brown, with brown patterns extending from the middle to the edges. Chelicerae yellowish brown, with dorsally dark colour haired. Sternum light brown, with short black hairs on the edges. While the tip of the abdomen is light brown, the part close to the spinnerets is dark brown. The ventral side of the abdomen white, with dark dotted pattern. Legs light yellow, covered with light colour hairs. Spinnerets light brown.
Pedipalp: cymbium flat and disc-like, very thin embolus originates basally, passes nearly one turn around bulbus; palpal tibia with 2 tibial apophyses ventrally, retrolateral one with small tooth opposite narrow ridge on base of cymbium. Palpal organ is characteristic as in Figs. (4-5).

Female (Figs. 2, 3)**:** Total length 5.4. Prosoma 2.1 long, 1.8 wide. Abdomen 3.3 long, 2.3 wide. Prosoma yellowish brown, its median part white. Chelicerae yellowish brown, with dorsally dark coloured hair. Sternum light brown, with short black hairs on the edges. Abdomen whitish, with brown patterns on the sides. While ventral side of the abdomen is white, the middle is light brown. Legs light yellow, covered with light colour hairs. Spinnerets light brown.
Genitalia: receptacles and copulatory ducts distinctly visible through integument. Epigynal plate longer than wide, with 2 atria, narrowed inward towards the anterior part. Copulatory ducts coiled. Epigyne as in Fig. (5C).

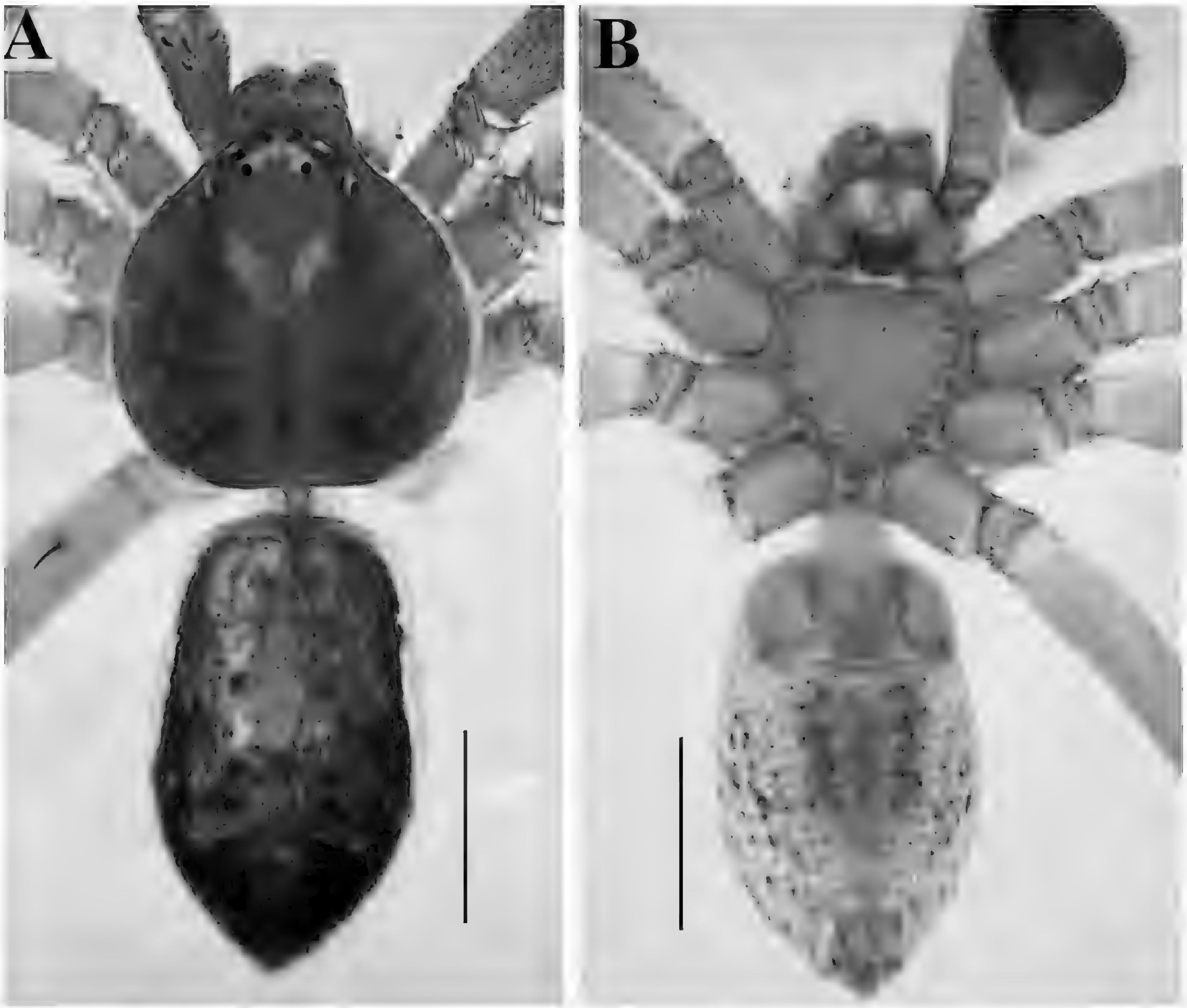

Fig. 1. *Philodromus dispar* ♂, habitus. A. dorsal view. B. ventral view. (Scale: 1 mm).

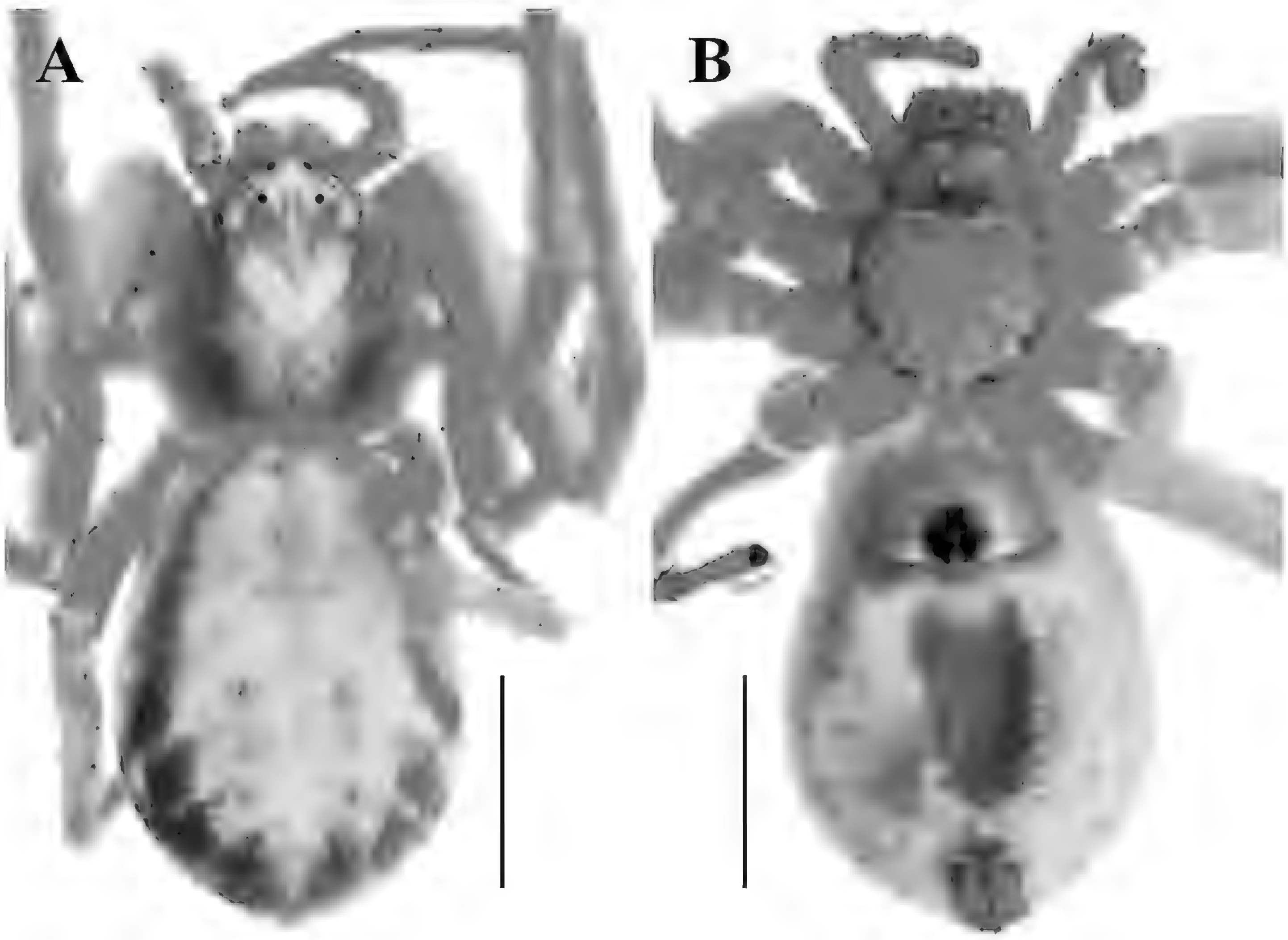

Fig. 2. *Philodromus dispar* ♀, habitus. A. dorsal view. B. ventral view. (Scale: 1 mm).

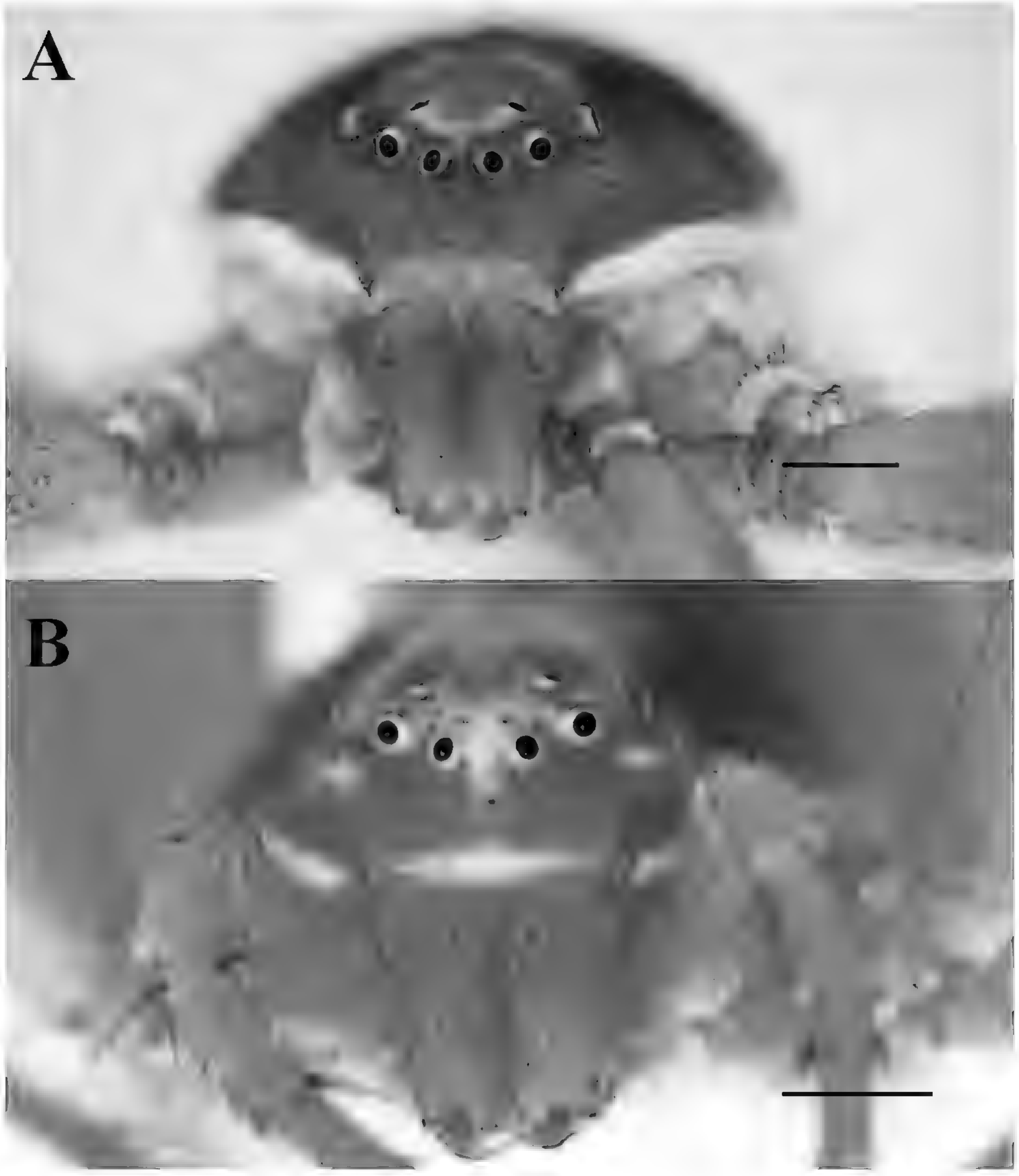

Fig. 3. *Philodromus dispar*, ocular area, frontal view. A. ♂. B. ♀. (Scale: 0.5 mm).

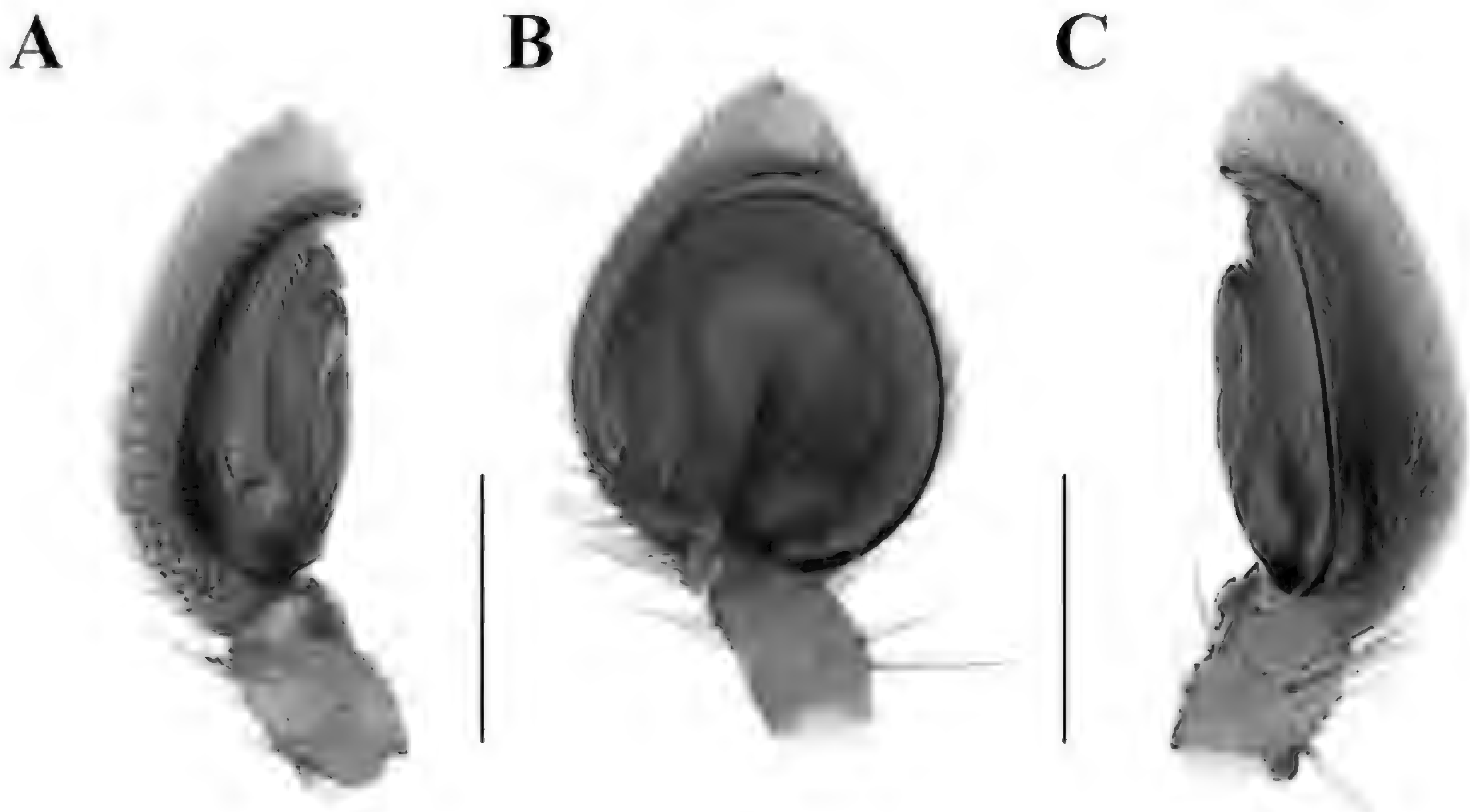

Fig. 4. *Philodromus dispar* ♂, pedipalp. A. retrolateral view. B. ventral view. C. prolateral view. (Scale: 0.5 mm).

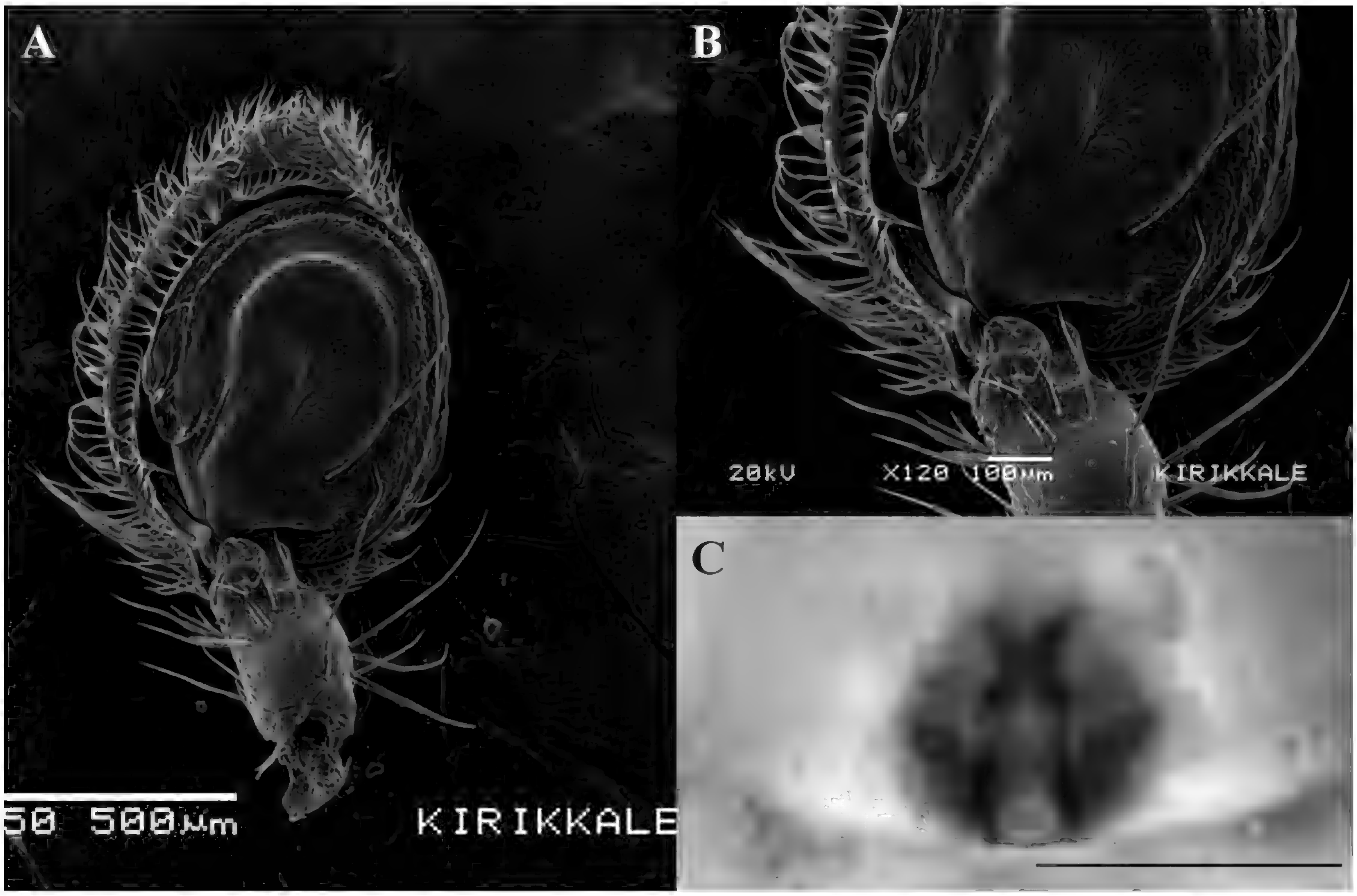

Fig. 5. *Philodromus dispar*. A-B. ♂ pedipalp, SEM micrographs. A. ventral view. B. tibial apophysis, ventral view. C. ♀ epigyne, ventral view. (Scale: 0.5 mm).

Discussion

Philodromus dispar is found in a variety of wooded habitats including conifers and mixed woods, scrubby and grass clusters. It is reported for the first time from Turkey. Compared with European specimens, no differences observed in individual body measurements of Turkish specimens. But, in European specimens, males can be completely dark black coloured.

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A new record for the spider fauna of Turkey: *Zelotes balcanicus* Deltshev, 2006 (Araneae: Gnaphosidae)

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Abstract

In this short paper, the characteristic features and photographs of *Zelotes balcanicus* Deltshev, 2006 from Turkey are presented. With this data, the number of species belonging to genus *Zelotes* increased to 32 in Turkey.

Keywords: Araneae, Gnaphosidae, *Zelotes balcanicus*, new record, Turkey.

Introduction

Gnaphosidae is the fourth largest spider family with 2539 described species in 159 genera distributed worldwide (World Spider Catalog, 2020). The known gnaphosid fauna of Turkey includes 147 species and 32 genera (Danışman *et al*., 2019). *Zelotes* Gistel, 1848 is a genus of the zelotine spiders, with 400 species listed in the latest version (21.0) of the world spider catalog (World Spider Catalog, 2020). The goal of this short paper is to provide new data about the *Zelotes* of Turkey. With this study, the number of gnaphosid species belonging to Turkish spider fauna has raised to 148.

Material and Methods

In this study, the total of twelve specimens belonging to *Zelotes balcanicus* Deltshev, 2006 were examined. They were collected from West Black Sea Region, Central Anatolia Region, Eastern Anatolia region, and Mediterranean Region of Turkey.

The specimens were taken through leaf litter by means of hand aspirator and sifter. Identifications were made by use of Leica S8APO Stereomicroscope. The identification mainly depended on Deltshev *et al.* (2006). Specimens were preserved in 70% ethanol. All measurements are given in millimetres. Pictures were taken, using a Leica S8APO microscope by means of a Leica DC 160 camera. Images were montaged using "CombineZM" image stacking software and "Photoshop CS5" image editing software. Specimens are deposited in the collection of the Arachnological Museum of Kırıkkale University (KUAM).

Results

Family **Gnaphosidae** Pocock, 1898

Genus ***Zelotes*** Gistel, 1848

Zelotes balcanicus Deltshev, 2006

Zelotes balcanicus Deltshev, in Deltshev et al., 2006: 711, f. 2-11 (D♂♀).

Zelotes baram Levy, 2009: 31, f. 67-70 (♂♀)

Zelotes argoliensis Chatzaki, 2010b: 54, f. 25-30 (♀)

Zelotes balcanicus Senglet, 2012: 504, f. 11-12 (♂♀)

Zelotes balcanicus Pantini & Mazzoleni, 2018: 29, f. 4a-d (♂♀)

Material examined: 1♂, 2♀♀, Ankara Province, Gölbaşı District (39°80'N, 32°78'E), 02.06.2015. 1♀, Kırıkkale Province, Yahşihan District (39°84'N, 33°45'E), 25.05.2009. 1♀, Sinop Province, Saraydüzü District, Aşağıakpınar village (41°33'N, 34°78'E), 12.06.2013, 2♂♂, 2♀♀, Kahramanmaraş Province, Onikişubat District, Fırnız Kayaözü Stream (37°45'N, 36°39'E), 04.05.2019. 3♀♀ Adıyaman Province, Ormaniçi Village (37°51'N, 38°18'E), 26.08.2019.

Distribution: Italy, Bulgaria, Romania, Greece, North Macedonia, Israel (World Spider Catalog, 2020).

Fig. 1. *Zelotes balcanicus* ♂, habitus. A. dorsal view. B. ventral view. (Scale: 1 mm).

Male: Total length 4.9. Prosoma 2.3 long, 1.3 wide. Abdomen 2.6 long, 1.8 wide. Prosoma is light brown and the middle and both sides are with black patterns (Fig. 1A). Clypeus brown, narrow and covered with a few dark colour hairs. Chelicerae dark brown with bright dark colour hair dorsally (Fig. 3B). Sternum light brown and intensely covered with short black hairs. Labium and maxillae light brown and intensely short black hairy (Fig. 1B). Abdomen is black and intensely covered with hairs, with scutum one-third the distance from the front (Fig. 1A). Spinnerets dark grey (Fig. 1B). While legs coxa, patella, and metatarsus segments yellowish brown, other segments dark brown and all segments covered with black hairs. Palpal tibial apophysis long and thin. Embolus small and spirally coiled. Median apophysis situated at apical end and edge of tegulum. Palp as in Fig. (4A-C).

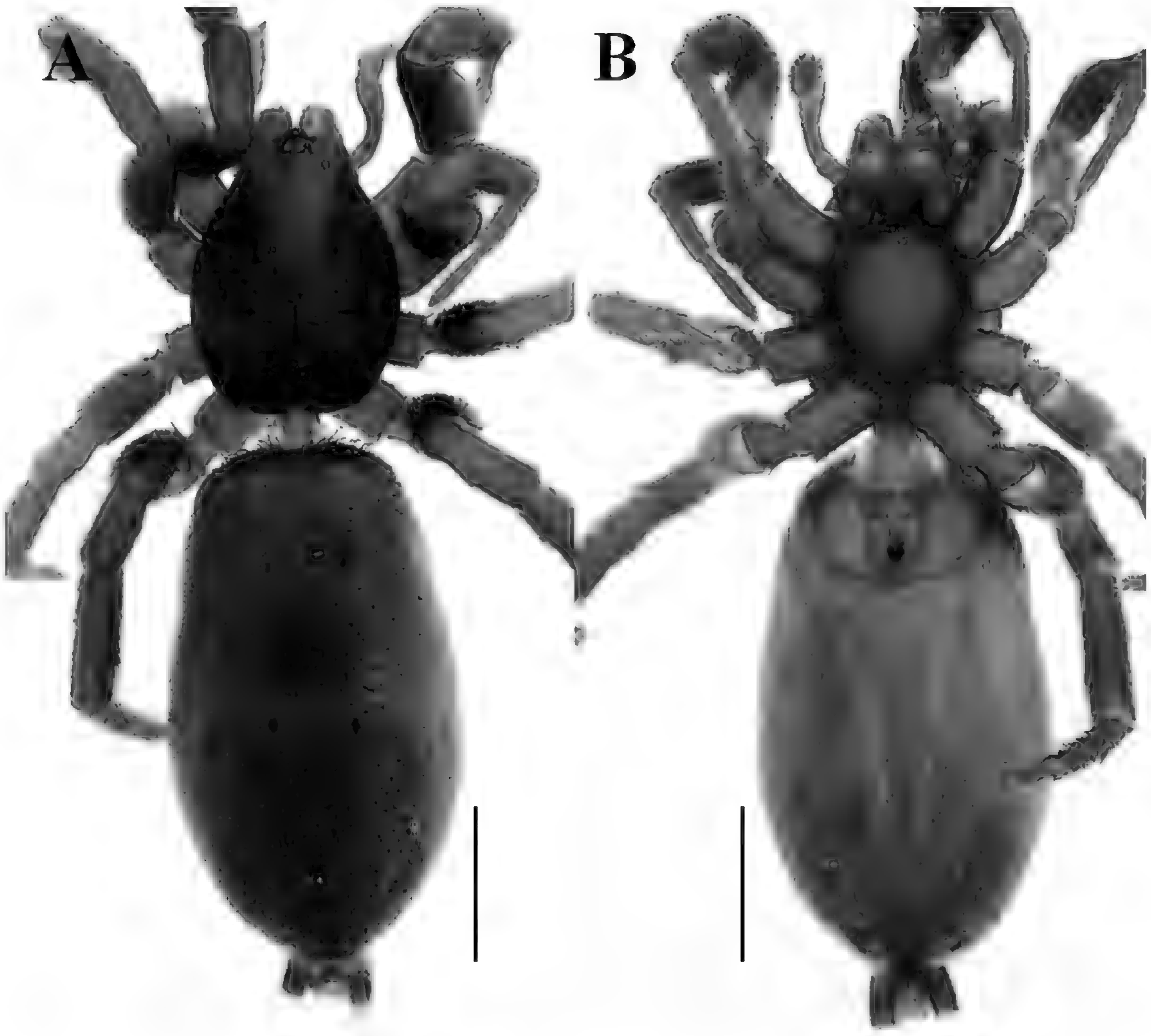

Fig. 2. *Zelotes balcanicus* ♀, habitus. A. dorsal view. B. ventral view. (Scale: 1 mm).

Fig. 3. *Zelotes balcanicus*, ocular area, frontal view. A. ♀. B. ♂. (Scale: 0.5 mm).

Female: Total length 6.4. Prosoma 1.8 long, 1.5 wide. Abdomen 4.6 long, 1.7 wide. Prosoma is dark brown and the middle and both sides are with black patterns (Fig. 2A). Clypeus is brown and narrow. Chelicerae dark brown with long dark colour hair dorsally (Fig. 3A). Sternum dark brown and intensely covered with short greyish hairs. Labium and maxillae are brown (Fig. 2B). Abdomen is grey and intensely covered with light hairs. But at the end of the abdomen there are long dark hairs and in the middle there are four black dots forming a rectangle (Fig. 2A). The ventral side of abdomen is light grey (Fig. 2B). Spinnerets brown. All legs are brown and covered with long hairs. Epigyne long and narrow. Anterior epigynal margin with 2 ear-shaped cap. Epigynal lateral margins long V-shaped (Fig. 4D).

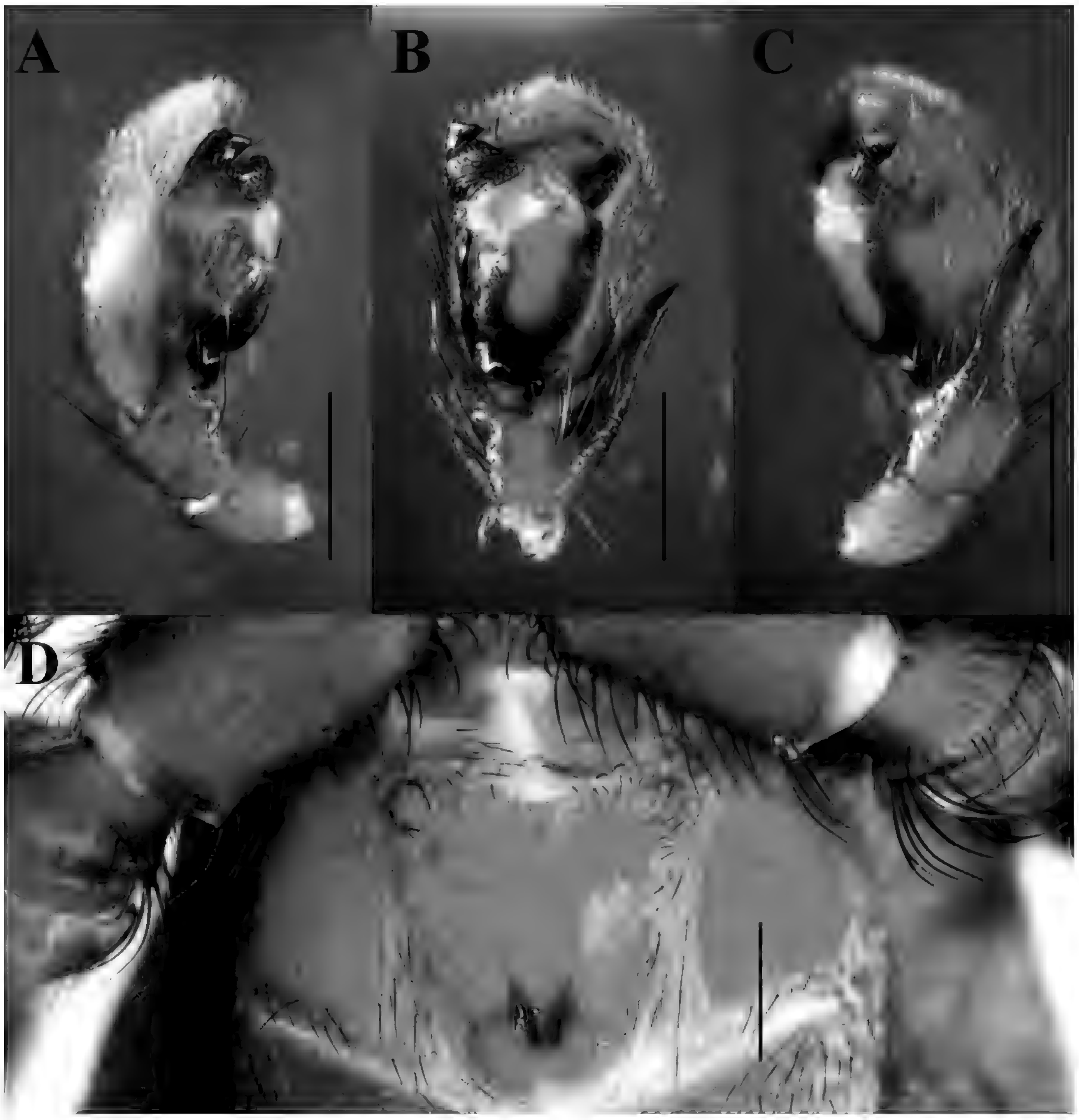

Fig. 4. *Zelotes balcanicus*. A-C. ♂, pedipalp. A. prolateral view. B. ventral view. C. retrolateral view. D. ♀, epigyne, venrtal view. (Scale: 0.5 mm).

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Serket (2020) vol. 17(2): 114-116.

Cedicus flavipes Simon, 1875 (Araneae: Cybaeidae) is a new spider record from Turkey

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Abstract

The cybaeid spider species, *Cedicus flavipes* Simon, 1875 is recorded for the first time from Turkey. Its general habitus and genitalia are illustrated with collecting data of this species in Turkey.

Keywords: Spider, *Cedicus flavipes*, new record, Turkey.

Introduction

The genus *Cedicus* Simon, 1875 was originally described in the Agelenidae and then placed in subfamily Cybaeinae by Simon (1875, 1898), now family Cybaeidae Banks, 1892. This genus includes very few species, only five, distributed in east Mediterranean countries and Central Asia (Levy, 1996). In Turkey, this genus includes only one species, *i.e. Cedicus israeliensis* Levy, 1996 (Demir & Seyyar, 2017). The aim of this paper is to present the cybaeid spider species *Cedicus flavipes* Simon, 1875 as a new record for the Turkish spider fauna.

Material and Methods

In this study, two male specimens were collected from Kayseri Province (Erciyes mountain) and Gümüşhane Province (Kelkit Valley) in Turkey. Examined specimens were preserved in 70% ethanol and deposited in the NOHUAM. For the identification, Levy (1996) and Özkütük *et al.* (2013) were consulted. The identification was made by means of a SZX61 Olympus stereomicroscope. In SEM photograph studies, the male palp

was mounted using double-sided tape on SEM stubs, coated with gold in a Polaron SC 502 Sputter Coater, and examined with a JEOL JSM 5600 Scanning Electron microscope at 20 kV. All measurements are in millimetres.

Fig. 1. Map showing localities of *Cedicus flavipes* Simon, 1875 in Turkey (Gümüşhane and Kayseri Provinces).

Results

Cedicus flavipes Simon, 1875

Collected specimens: 1♂, **Gümüşhane Province:** Şiran district, Seydibaba village, around the Tomara fall (40°06'20.95"N, 36°02'42.28"E), elev. 1540 m (30.V.2019), Leg. Hakan Demir. 1♂, **Kayseri Province:** Hisarcık District, Erciyes Mountain (38°34'36.3"N, 35°29'49.9"E), elev. 2000 m (21.VI.2018), Leg. Osman Seyyar.

Fig. 2. *Cedicus flavipes* Simon, 1875 ♂, habitus, dorsal view.

Fig. 3. Male palp of *Cedicus flavipes* Simon, 1875. A. ventral view. B. retrolateral view. C. prolateral view.

Fig. 4. SEM photographs of male palp of *Cedicus flavipes* Simon, 1875.

Acknowledgments

The authors acknowledge the Scientific and Technological Research Council of Turkey (TÜBİTAK) (Project no: 118Z361) and Niğde Ömer Halisdemir University Scientific Research Project Unit (Project No. FEB 2018/09- TÜBİTAK C).

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Further notes on a little known spider species, *Zelotes strandi* (Araneae: Gnaphosidae) from Anatolia

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Abstract

Zelotes strandi was originally described by Nosek (1905) from the Büyükada Island in Turkey's European part (Thrace). Here, it is recorded for the first time from Anatolia adding new localities to its distribution. Its general habitus and genitalia are illustrated with collecting data of this species in Turkey.

Keywords: Spiders, *Zelotes strandi*, new record, Anatolia, Turkey.

Introduction

Ground spiders are now the largest spider family in Turkey. The known gnaphosid fauna of Turkey includes 150 species and 34 genera (Demir & Seyyar, 2017; Seyyar *et al.*, 2019a,b,c). *Zelotes strandi* was originally described from a single female as a new species from Büyükada (Prinkipo Island) in Turkey by Nosek (1905). We could find both sexes of this species from Anatolia. The aim of this paper is to present the gnaphosid spider *Zelotes strandi* Nosek, 1905 as a new record for the Anatolia. The recording of this species from Anatolia widens its distribution to the south and east in Turkey (Fig. 1).

Material and Methods

In this study, both male and female specimens were collected from Sivas and Tokat Provinces (Kelkit Valley) in Anatolia. Examined specimens were preserved in 70% ethanol and deposited in the NOHUAM. For identification, Deltshev (2013) was

consulted. The identification was made by means of a SZX61 Olympus stereomicroscope.

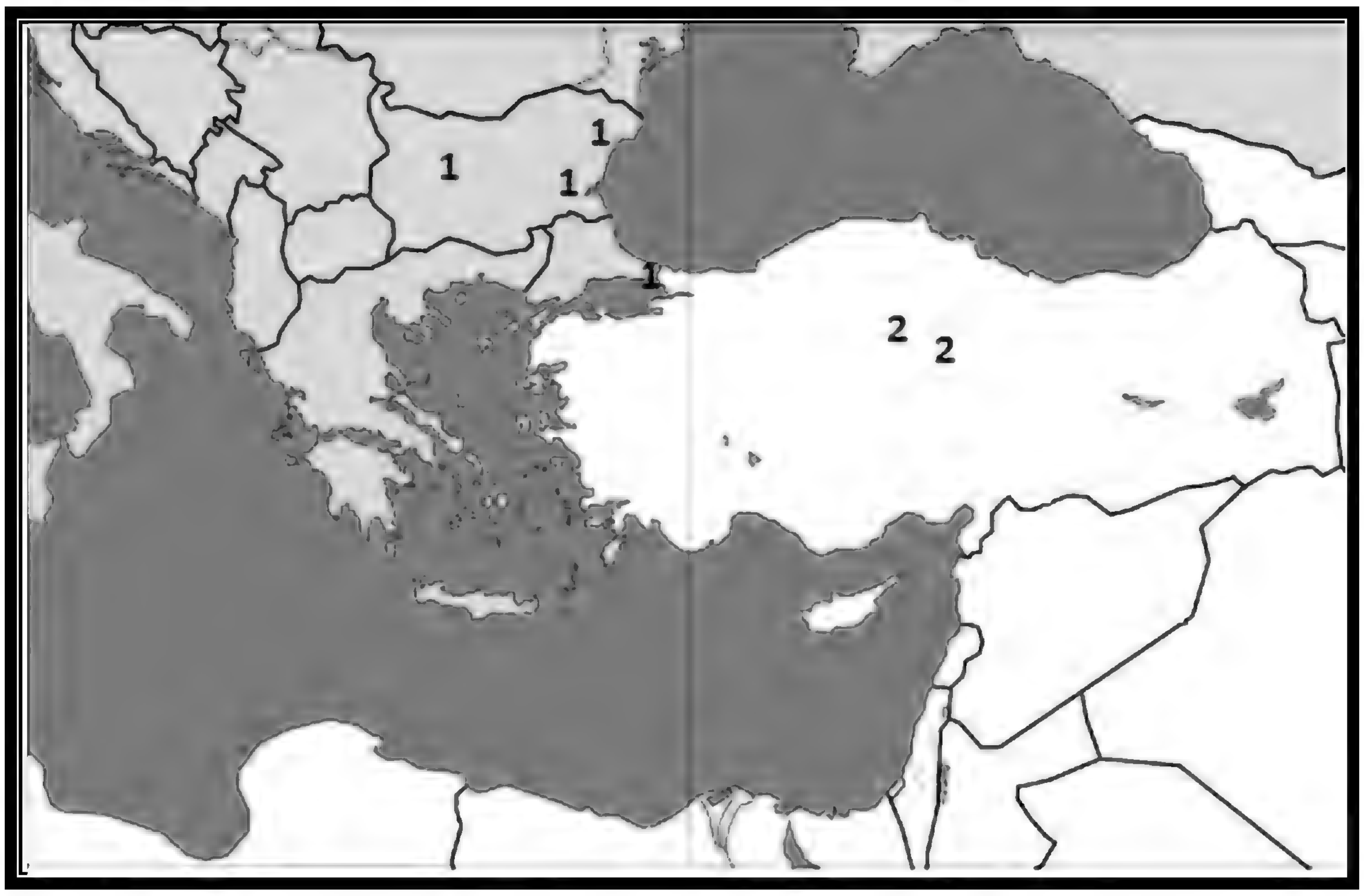


Fig. 1. Localities of *Zelotes strandi* (Nosek, 1905). 1 = Old localities (Bulgaria and Turkey, Princess Islands, Prinkipo, Büyükada), 2 = New localities (Anatolia). [Map from https://www.nkfu.com/avrupa-haritasi/ 26.II.2020].

Results

Zelotes strandi (Nosek, 1905)

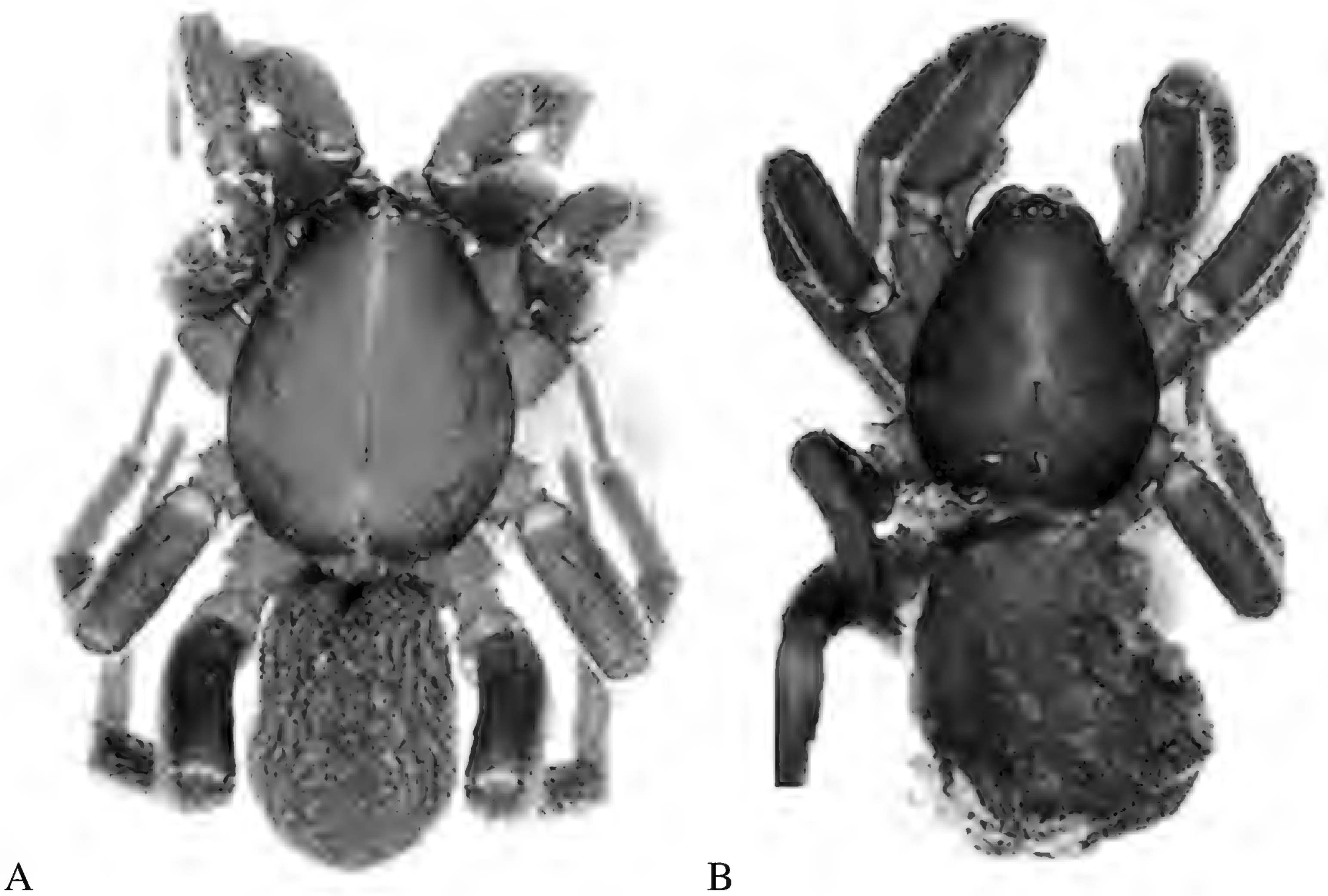
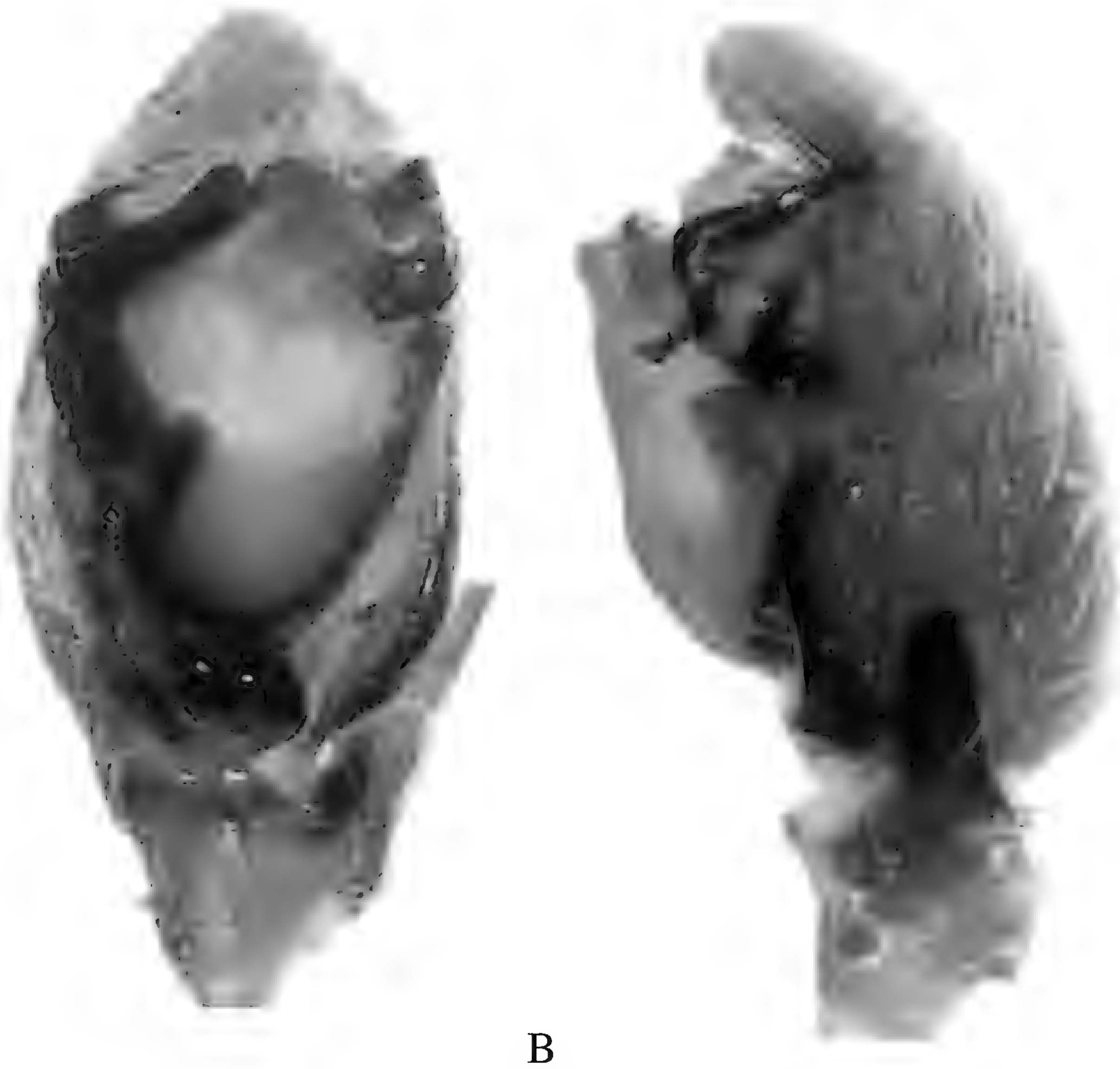


Fig. 2. *Zelotes strandi* (Nosek, 1905), habitus, dorsal view. A. male. B. female.

Taxonomic references

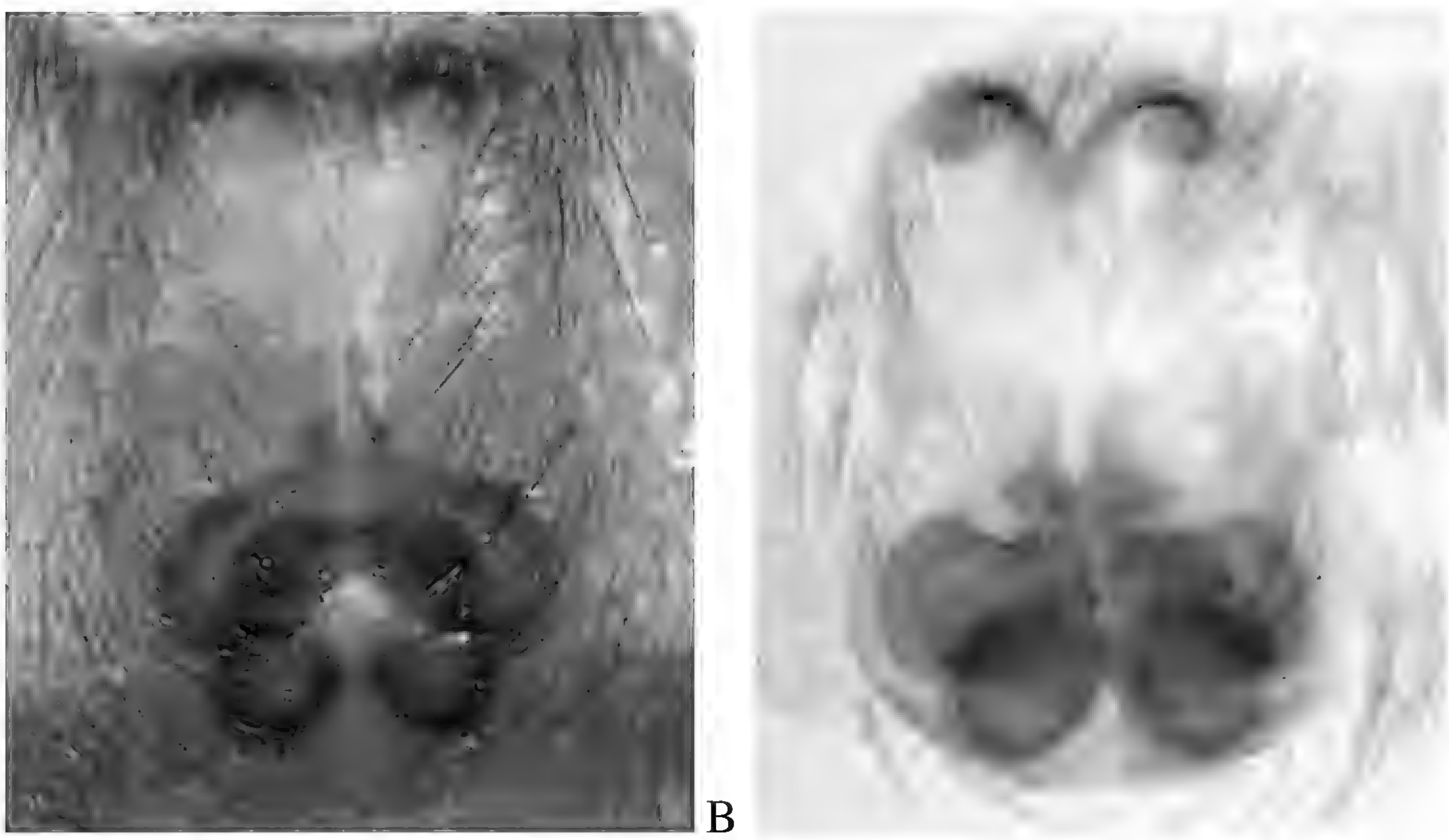
Prosthesima strandi Nosek, 1905: 126, f. 7 (D♀).
Zelotes strandi Deltshev, 2013: 4, f. 2-8, 10, 12, 14 (♀, D♂).

Collected specimens: 2♂♂, 1♀, **Sivas Province:** Koyulhisar District, Gökdere village (40°18'21.40"N, 37°38'19.49"E), elev. 691 m (23.VII.2015); 2♀♀, **Tokat Province:** Niksar District, Arpaören village (40°30'10.62"N, 36°59'37.36"E), elev. 512 m (30.V.2019), Leg. Osman Seyyar & Hakan Demir.



A B

Fig. 3. Male palp of *Zelotes strandi* (Nosek, 1905). A. ventral view. B. retrolateral view.



A B

Fig. 4. Female *Zelotes strandi* (Nosek, 1905), ventral view. A. epigyne. B. vulvae.

Acknowledgment

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Poecilochroa senilis (O. Pickard-Cambridge, 1872) (Araneae: Gnaphosidae) recorded for the first time in Algeria and Morocco, with the proposition of a new synonym

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Abstract

In this paper, the first records of *Poecilochroa senilis* (O. Pickard-Cambridge, 1872) in Algeria and Morocco are introduced. Different views of general habitus, male palp and female epigyne are presented. Examination of the type material of *Prosthesima incompta* (Pavesi, 1880) reveals that it is a junior synonym of *P. senilis* (O. Pickard-Cambridge, 1872). The species is now known from all North African countries.

Keywords: Northern Sahara, Maghreb, wetland, spiders, species range.

Introduction

The Gnaphosidae is the fifth most diversified family in genera among spiders and counts actually 158 genera, and the genus *Poecilochroa* Westring, 1874 contains 39 species and 1 subspecies (World Spider Catalog, 2020), of which 4 species occur in North Africa (Table 1).

Table 1. Distribution of *Poecilochroa* species in North Africa.

Species	Morocco	Algeria	Tunisia	Libya	Egypt
Poecilochroa albomaculata	x	x	x		
Poecilochroa incompta			x		
Poecilochroa pugnax				x	x
Poecilochroa senilis			x	x	x

For this genus, only *Poecilochroa albomaculata* (Lucas, 1846) is occurring in Algeria and Morocco in addition to Tunisia; in Algeria it is known from El Kala and Kouba (Lucas, 1846), Biskra (Thorell, 1875), Djebel Arras, Djebel Daya (Denis, 1937) and Algiers (Simon, 1899); in Tunisia from Tunis (Pavesi, 1884) and Jendouba (Simon, 1885) and only from one locality in Morocco: Ifrane (Denis, 1955). *Poecilochroa incompta* (Pavesi, 1880) is known only from Tunisia. *Poecilochroa pugnax* (O. Pickard-Cambridge, 1874) only from Egypt and Libya and *Poecilochroa senilis* (O. Pickard-Cambridge, 1872) from Tunisia, Libya and Egypt. It is to mention that data about the spider fauna of all North African countries are scarce, and the available information is outdated and concerns only some parts of these countries.

The female of *Poecilochroa senilis* was described for the first time by O. Pickard-Cambridge (1872) from the plains of the Jordan (Palestine) and near Alexandria (Egypt) as *Drassus senilis*. The same author (1874) described the male later as *Drassus campestratus* from Alexandria in Egypt.

The occurrence of this species in North Africa is as follow: from Egypt in Omayed (El-Hennawy, 2005 & 2017) and Alexandria (O. Pickard-Cambridge, 1872 & 1974; El-Hennawy, 2017), from Libya in Al Marj (Caporiacco, 1934) and Shahat (Caporiacco, 1949), and from Tunisia in Djerba, El Kef, Gabès, Gafsa and Sidi Salem Bou Grara (Simon, 1885). It should be noted that Caporiacco (1949) had cited *P. senilis* from Algeria but without any reference or precise locality.

In the present paper, the first records of *Poecilochroa senilis* for Algeria and Morocco are introduced, and the presence in Tunisia is confirmed.

Material and Methods

Study area

The study area comprises the three countries: Algeria, Morocco and Tunisia. The individuals were captured during many years from different localities, the sampling sites are located in the central parts of these countries, including Saharan regions, as an example Ghardaïa, that is located in the northern Sahara of Algeria, at 600 km to south of the capital Algiers, is characterized by a hot arid climate with a mild winter. The annual recorded precipitations and mean temperatures for this region are: 33.79 mm and 22.5°C during 2017.

Kef Doukhane is a wetland located at 15 km to the south-east of the city of Ghardaïa. According to Alioua *et al.* (2020), it is a channel in a riverbed of about 22 km length, supplied by treated wastewater from the treatment plant of El Atteuf. It passes different rocky and sandy structures and is characterized by vegetation on the banks, hosting several species of birds, reptiles and other animals (Fig. 1).

Sampling

Material was collected by the first author in Algeria during 2017, directly from the vegetation around the Wadi of Kef Doukhane, and by the second author directly or by using pitfall traps in: Algeria during 1989, Tunisia during 2005, and Morocco during 1996 and 2012. Also a specimen is collected by a colleague from Tunisia in 2016. The specimens were preserved in 70% ethanol.

A stereomicroscope Nikon SMA 1270 was used for specimens' examination and a Moticam camera mounted on a Realux microscope and Olympus SZX7 stereomicroscope to take photographs of the spiders.

Abbreviations: CRB: Collection Robert Bosmans; CYA: Collection Youcef Alioua; HECO: Hope Entomological collection, Oxford; MCSNG: Museo Civico di Storia Naturale, Genova.

Fig. 1. General view of Kef Doukhane River, Algeria.

Results

Poecilochroa senilis (O. Pickard-Cambridge, 1872) (Figs. 2-4)
Drassus senilis O. Pickard-Cambridge, 1872: 236, pl. 15, fig. 13 (descr. ♀).
Drassus campestratus O. Pickard-Cambridge, 1874: 392, pl. 51, fig. 17 (descr. ♂).
Prosthesima incompta Pavesi, 1880: 350 (descr. ♀).

A complete list of relevant descriptions and citations can be found in World Spider Catalog (2020).

Type material
- 13♀♀ syntypes of *Drassus senilis* from plains of the Jordan, Israel and 1♀ from near Alexandria, Egypt (HECO); examined by Levy (1999).
- Holotype ♂ of *Drassus campestratus* from near Alexandria, Egypt (HECO); examined by Levy (1999).
- Type series of *Poecilochroa incompta* containing 2♀♀ from Tunisia, labelled handwritten: «*Prosthesima incompta* Pavesi Typi 1877 fra Erghela e Susa, El Gem » (= between Enfida? and Sousse, El Djem; (MCSNG); examined by RB.

Comments
Prosthesima incompta was described from Tunisia in 1880, without any figure of the epigyne. For this reason, the species could not be recognized and it was never cited since then. Examination of the type material reveals the species is a junior synonym of *Poecilochroa senilis* (O. Pickard-Cambridge, 1872).

Further material examined

ALGERIA: Ghardaïa: Kef Doukhane River (32.4193°N, 3.8841°E), 410 m a.s.l, 1♂, on vegetation near the river, 14.X.2017, 1♀, same habitat, 24.XI.2017 (CYA). Laghouat: 20 km south Laghouat (33.6946°N, 2.9282°E), 810 m a.s.l., 2♂♂, pitfalls under *Zizyphus*, in a Daya, 3.XI.1989 (CRB).

TUNISIA: Kasserine: Thelepte (34.9758°N, 8.5939°E), 750 m a.s.l, 1♀, stones in ruins, 1.III.2005 (CRB). Kébili: Ancienne Kébili (33.6856°N, 8.9535°E), 35 m a.s.l, 1♂, pitfalls in oasis, 8.IV.2016 (CRB).

MOROCCO: Drâa-Tafilalt: Barrage Youssef Ben Tachfine (29.8408°N, -9.4977 W), 100 m a.s.l, 2♀♀, in a stony steppe, 27.IV.2012 (CRB). Souss-Massa: Tizi n Ikhsane (30.4488°N, -7.5233W), 1650 m a.s.l, 1♀, hand catch in stones on border of ploughed fields, 4.II.1996 (CRB).

Distribution: France (Corsica) to Turkmenistan (World Spider Catalog, 2020). In North Africa (Fig. 5), the species is found only in localities near the sea in Egypt and Libya, almost everywhere in Tunisia, and more to the south in Algeria and Morocco, in hot desert climate zones where aridity level is getting higher.

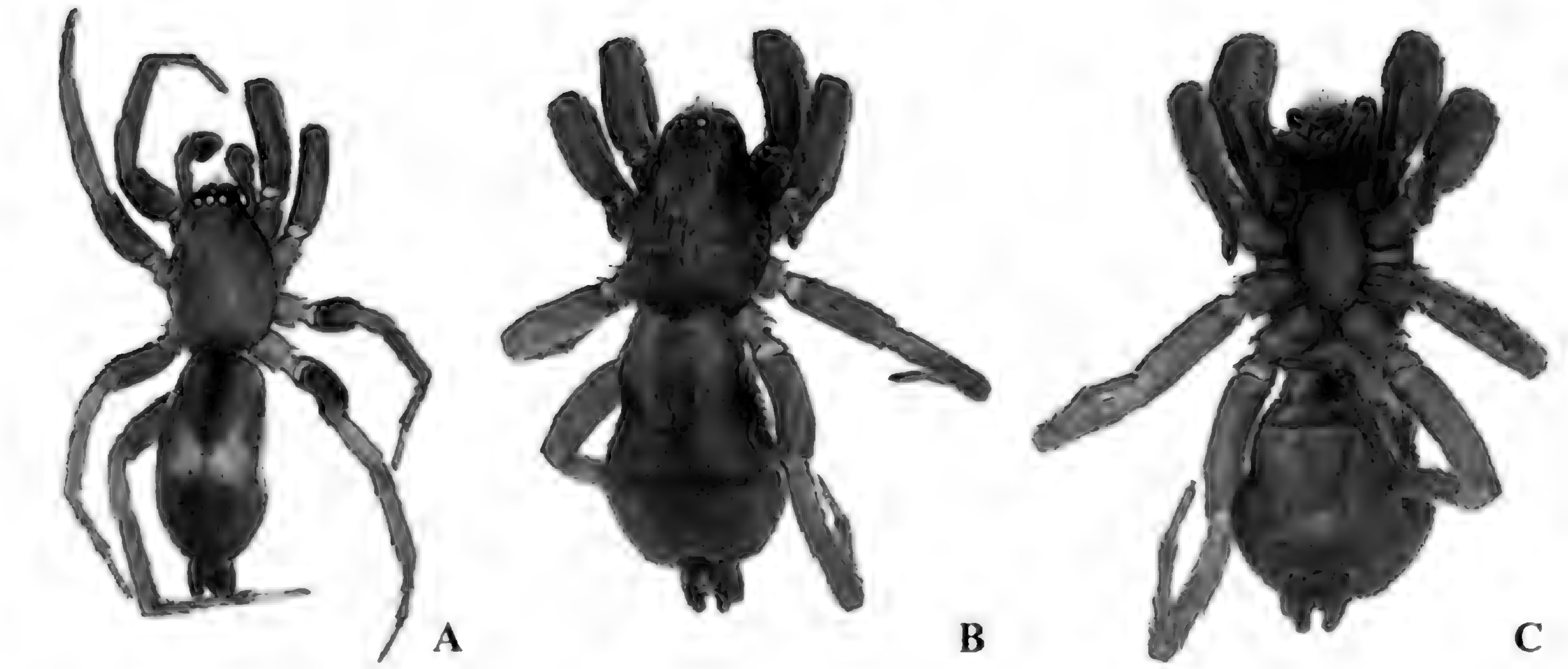

Fig. 2. *Poecilochroa senilis* from Ghardaïa, Algeria. A. Male, dorsal view. B-C. Female. B. dorsal view. C. ventral view.

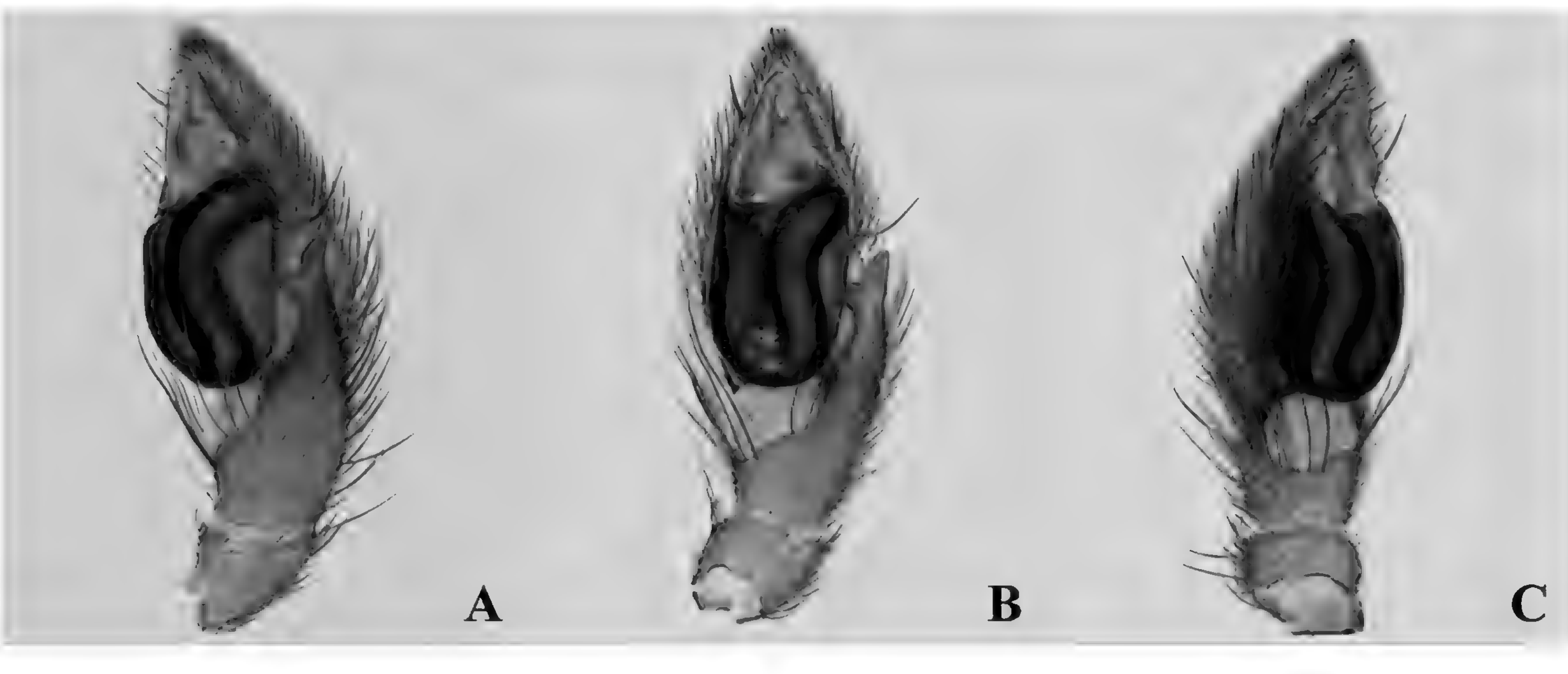

Fig. 3. Male palp of *Poecilochroa senilis*. A. retrolateral view. B. ventral view. C. prolateral view.

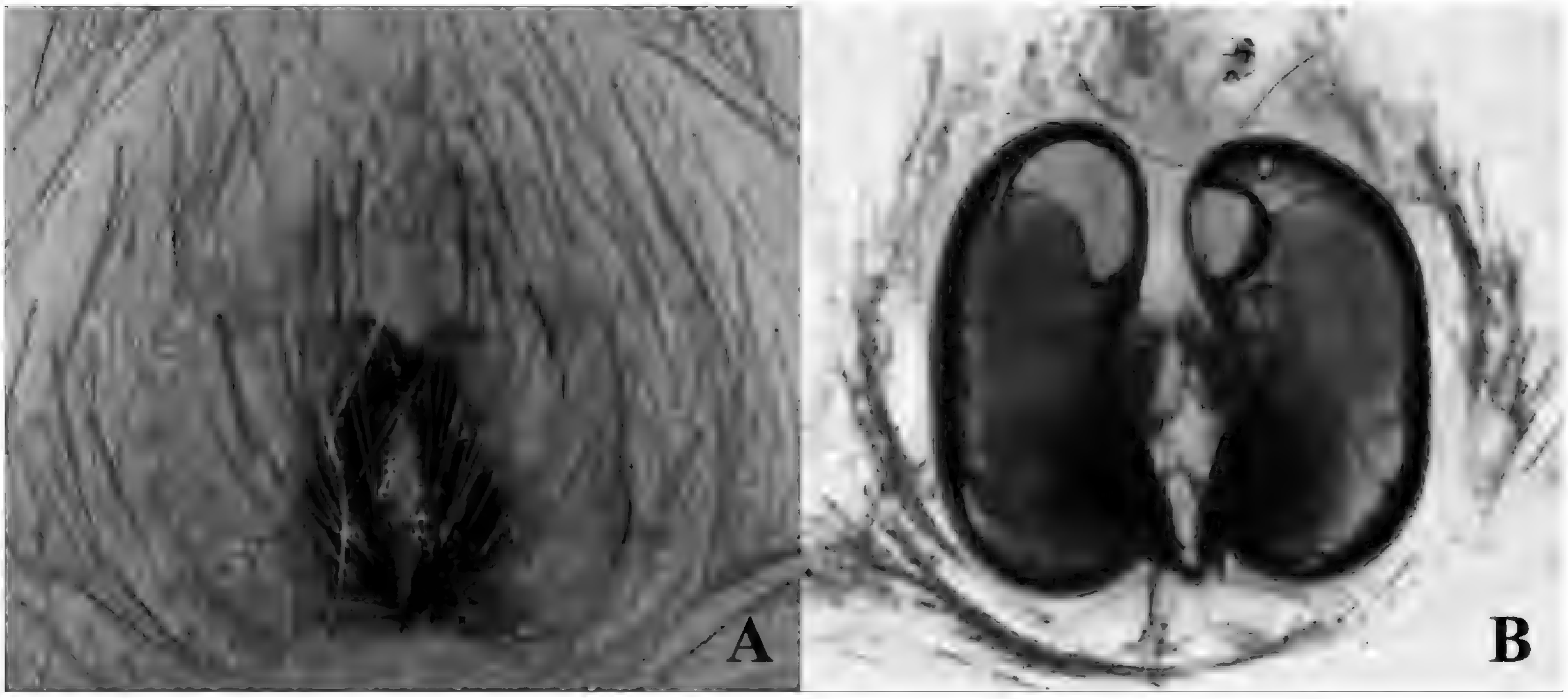

Fig. 4. Female of *Poecilochroa senilis*. A. ventral view of epigyne. B. Vulvae.

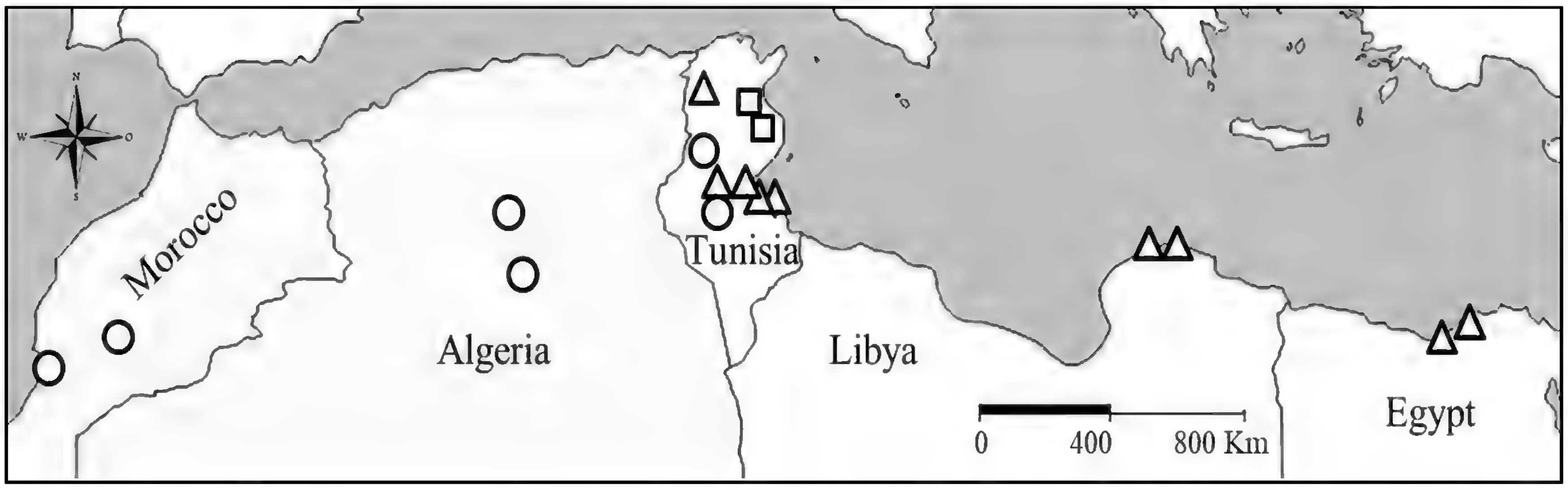

Fig. 5. Map of known and new records of *Poecilochroa senilis* in North Africa (circles: new records, triangles: previous records, rectangles: localities of junior synonym).

Acknowledgments

We would like to thank Pierre Oger for his help in photographing specimens and J. Hernández-Corral for communicating material from Tunisia. Maria Tavano (Genoa) is thanked for the loan of type material. The first author also expresses his thanks to Prof. Johan Mertens and Dr. Lynda Beladjal from the University of Ghent for their support and assistance during lab work.

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Taxonomic notes on genus *Synaphosus* Platnick & Shadab, 1980 (Araneae: Gnaphosidae) in Turkey

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Abstract

In this paper, two species of ground spiders are recorded for the first time from Turkey: *Synaphosus shirin* Ovtsharenko, Levy & Platnick, 1994 and *Synaphosus trichopus* (Roewer, 1928). In addition, these species are redescribed and illustrated in detail.

Keywords: Araneae, Gnaphosidae, *Synaphosus*, new record, Turkey.

Introduction

Gnaphosidae is one of the big spider families that contains 2523 worldwide species from 158 genera (World Spider Catalog, 2020). This family is now the largest spider family in Turkey containing more than 147 species and 32 genera (Danışman *et al.*, 2019). Genus *Synaphosus* was established by Platnick & Shadab (1980) as a new genus from North America. So far, thirty-two species have been described in genus *Synaphosus*. Its species are distributed in the Palaearctic region, Asia, Africa, and North to central America (World Spider Catalog, 2020). Until now, only *Synaphosus palearcticus* Ovtsharenko, Levy & Platnick, 1994 is recorded from Turkey (Danışman *et al.*, 2019).

This paper deals with the characteristic features and distribution of *Synaphosus shirin* Ovtsharenko, Levy & Platnick, 1994 and *Synaphosus trichopus* (Roewer, 1928), adding two new gnaphosid species to the araneo-fauna of Turkey.

Material and Methods

Specimens were collected from Muğla, Mardin and Şanlıurfa provinces using artificial overwintering shelter traps or by hand picking. Digital images were taken using a Leica S8APO microscope by means of a Canon EOS 250D camera. Images have been montaged using 'Combine ZM' image stacking software and 'Photoshop CS5'image editing software. For SEM photography, the male palps were dried at 30ºC temperature and put on stubs, coated with gold, and examined at an accelerating voltage of 10 kV under Jeol JSM 5600 Scanning Electron Microscope. Specimens were deposited in the collection of the Arachnological Museum of Kırıkkale University (KUAM). All measurements are made in millimetres. Leg measurements are shown as: total length (femur: Fe, patella: Pa, tibia: Ti, metatarsus: Mt, and tarsus: Ta). Identification depended on Chatzaki & Russell-Smith (2017) and Chatzaki *et al.* (2002).

Results

Synaphosus Platnick & Shadab, 1980
Synaphosus shirin Ovtsharenko, Levy & Platnick, 1994
Material examined: 2♂♂, Şanlıurfa Province, Birecik District, Yukarıkarabaş Vicinity (37°04'57"N, 37°58'14"E), 15.09.2017-31.01.2018, alt. 340 m. From pistachio orchards by artificial overwintering shelter trap, Leg. M. Mamay; 1♂, Mardin Provinces, Artuklu District, Dara Vicinity (37°10'38"N, 40°56'51"E), 09.05.2018, alt. 930 m. from stony area by hand picking, Leg. T. Danışman.

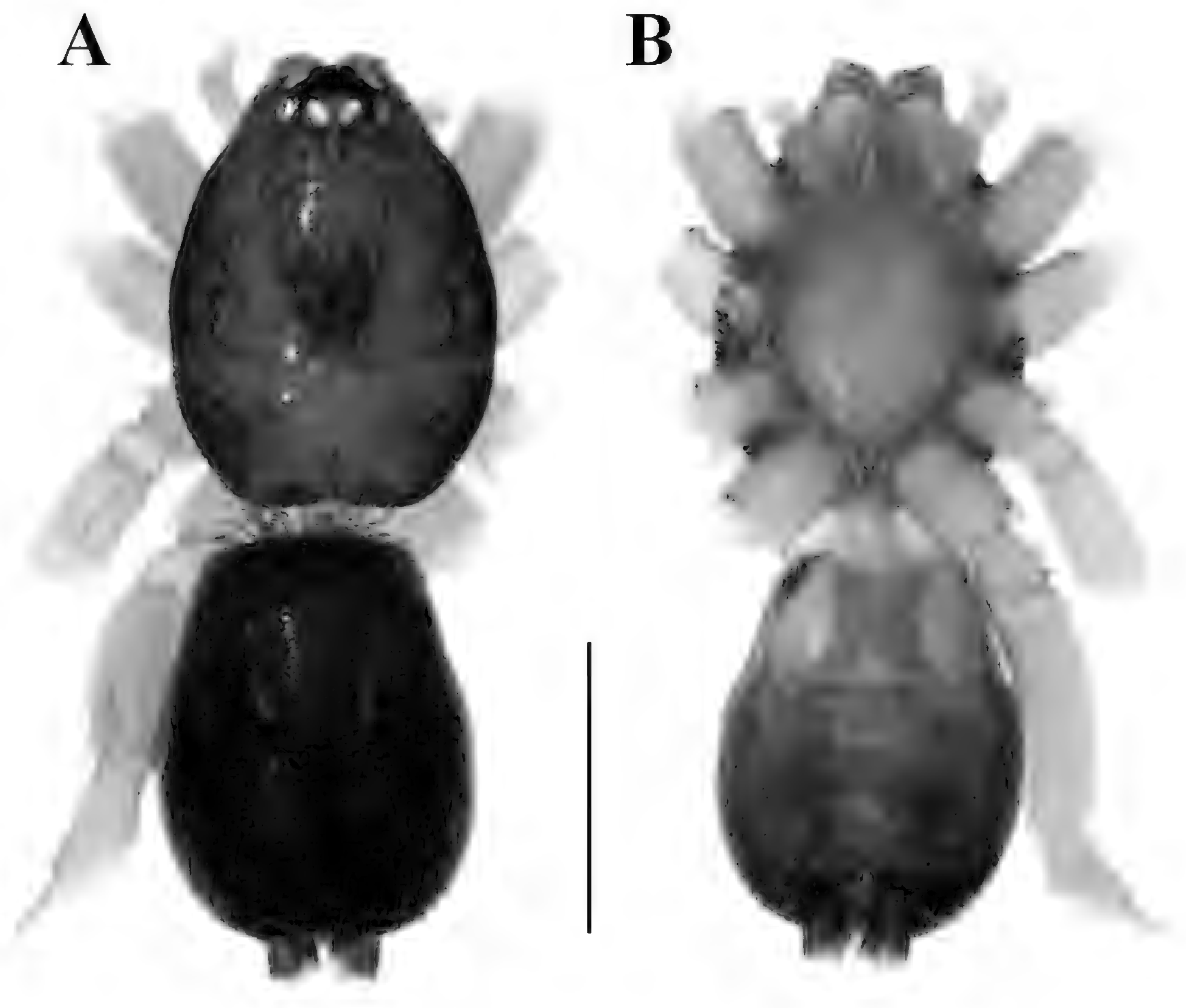

Fig. 1. *Synaphosus shirin* Ovtsharenko, Levy & Platnick, 1994 ♂, habitus. A. dorsal view. B. ventral view. (Scale: 1 mm).

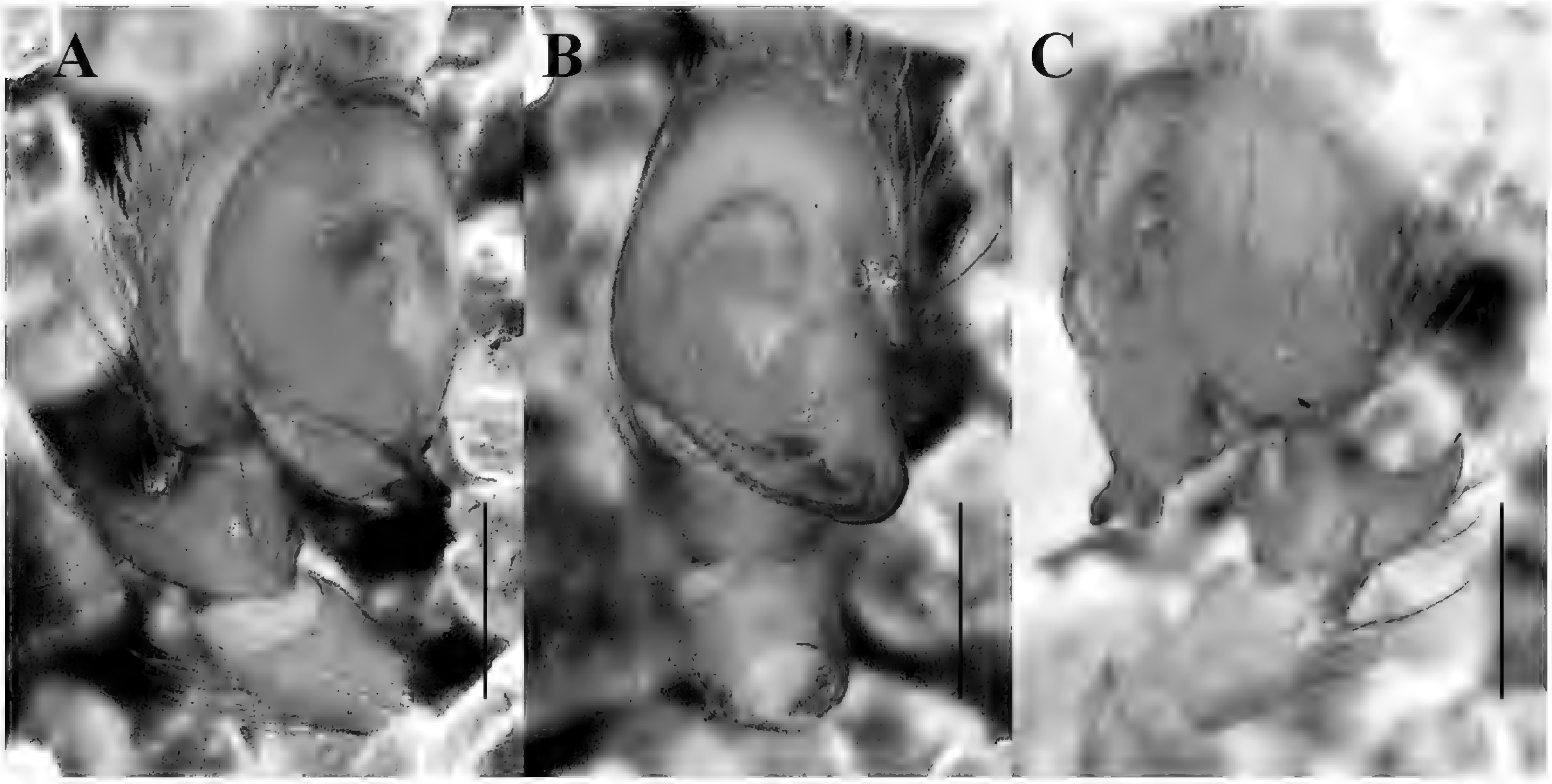

Fig. 2. *Synaphosus shirin* Ovtsharenko, Levy & Platnick, 1994 ♂, left pedipalp. A. prolateral view. B. ventral view. C. retrolateral view. (Scale: 0.2 mm).

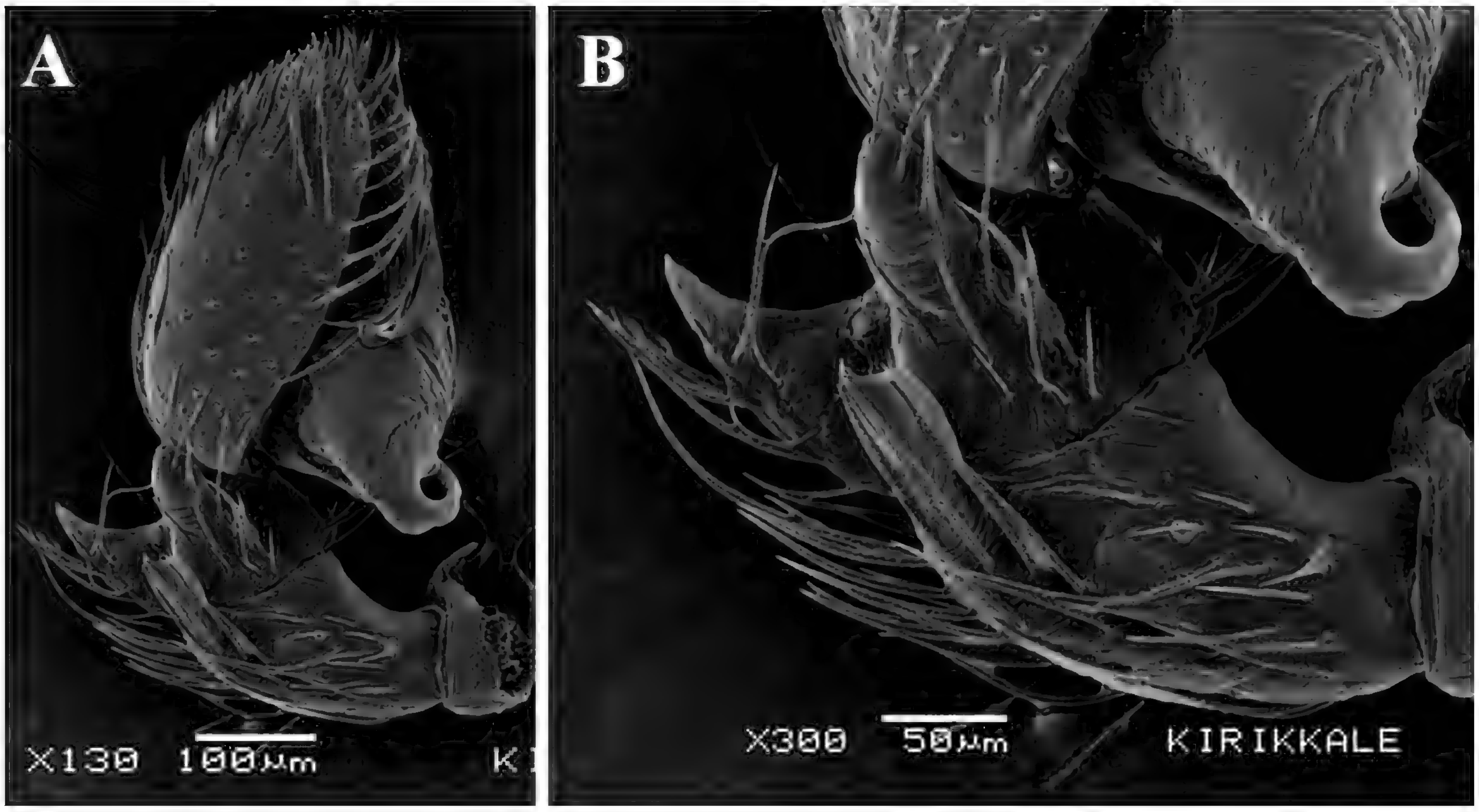

Fig. 3. *Synaphosus shirin* Ovtsharenko, Levy & Platnick, 1994 ♂, SEM micrographs of right pedipalp. A. retrolateral view. B. tibial and patellar apophyses, retrolateral view.

Distribution: Cyprus, Iran (World Spider Catalog, 2020).

Description of male: Total length 2.7, Prosoma 1.4 long, 1.0 wide. Abdomen 1.3 long, 0.9 wide. Prosoma brown, darker around the anterior median eyes. Abdomen pale greyish brown, abdominal dorsal scutum covering 1/3 of opisthosoma. Sternum and walking legs pale yellow (Fig. 1). Leg formula: IV-I-II-III. Lengths of legs segments: leg I. 3.3 (Fe: 1.0, Pa: 0.5, Ti: 0.7, Mt: 0.6, Ta: 0.5). leg II. 2.5 (Fe: 0.8, Pa: 0.3, Ti: 0.5, Mt: 0.5, Ta: 0.4). leg III. 2.2 (Fe: 0.6, Pa: 0.3, Ti: 0.5, Mt: 0.4, Ta: 0.4). leg IV. 3.7 (Fe: 1.0, Pa: 0.5, Ti: 0.8, Mt: 0.9, Ta: 0.5). Pedipalp with two tibial apophyses. The first of these apophyses extends to the retrolateral side, in the form of a pointed and thin tooth. The second apophysis is smaller, with rounded end, it extends to the dorsal side. In addition, the pedipalp contains a pointed retrolateral patellar apophysis extending to the retrolateral side. Embolus long and filiform shaped, with denticulated surface (Figs. 2-3).

Synaphosus trichopus (Roewer, 1928)

Material examined: 2♂♂, Muğla Province, Fethiye District, Ölüdeniz National Park, (36°33'15"N, 29°07'25"E), 17.05.2015, alt. 340 m. From stones in open *Quercus ilex* forest by hand picking, Leg. T. Danışman.

Fig. 4. *Synaphosus trichopus* (Roewer, 1928) ♂, habitus. A. dorsal view. B. ventral view. (Scale: 1 mm).

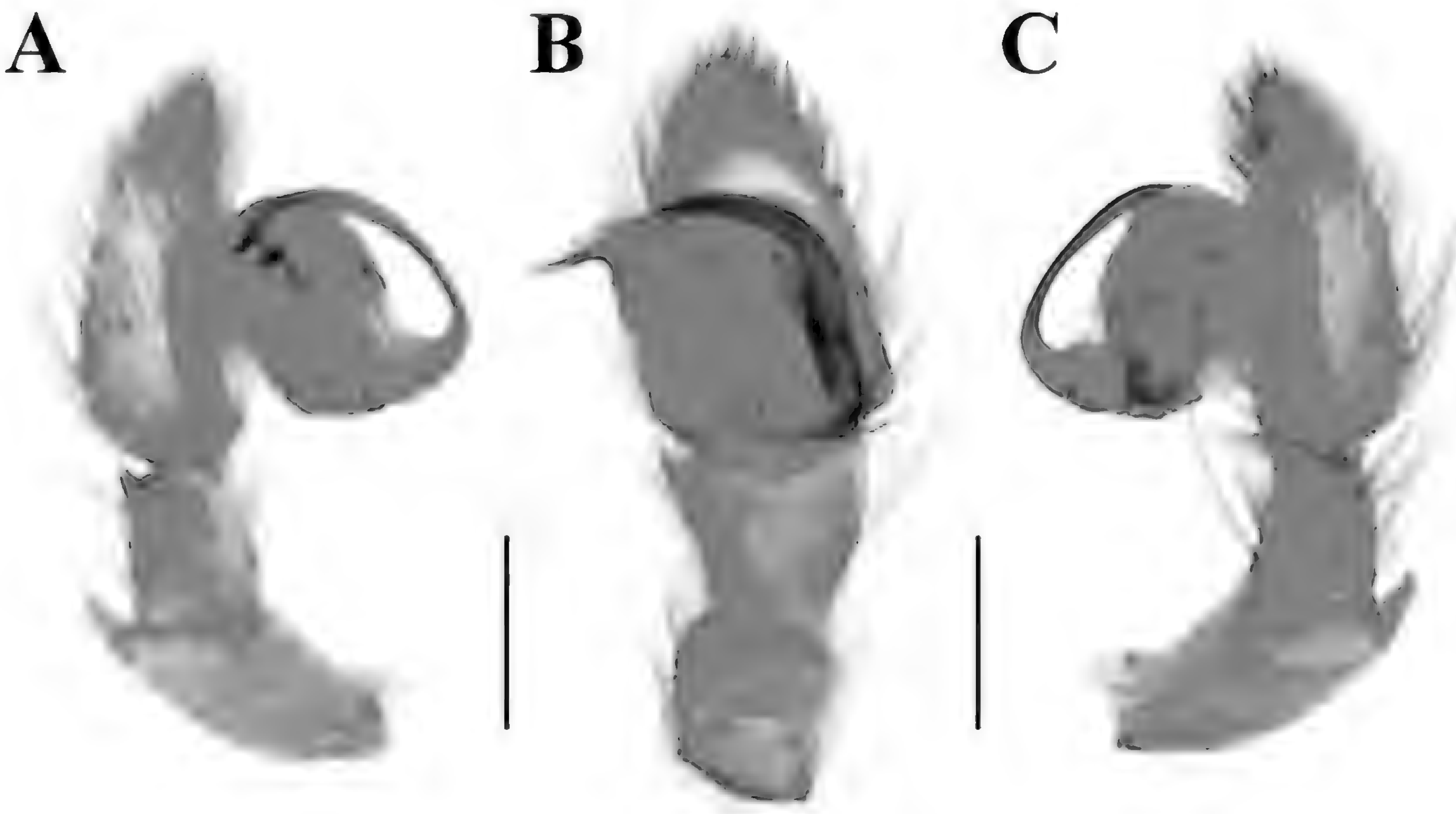

Fig. 5. *Synaphosus trichopus* (Roewer, 1928) ♂, right pedipalp. A. retrolateral view. B. ventral view. C. prolateral view (bulb in a slightly raised position). (Scale: 0.2 mm).

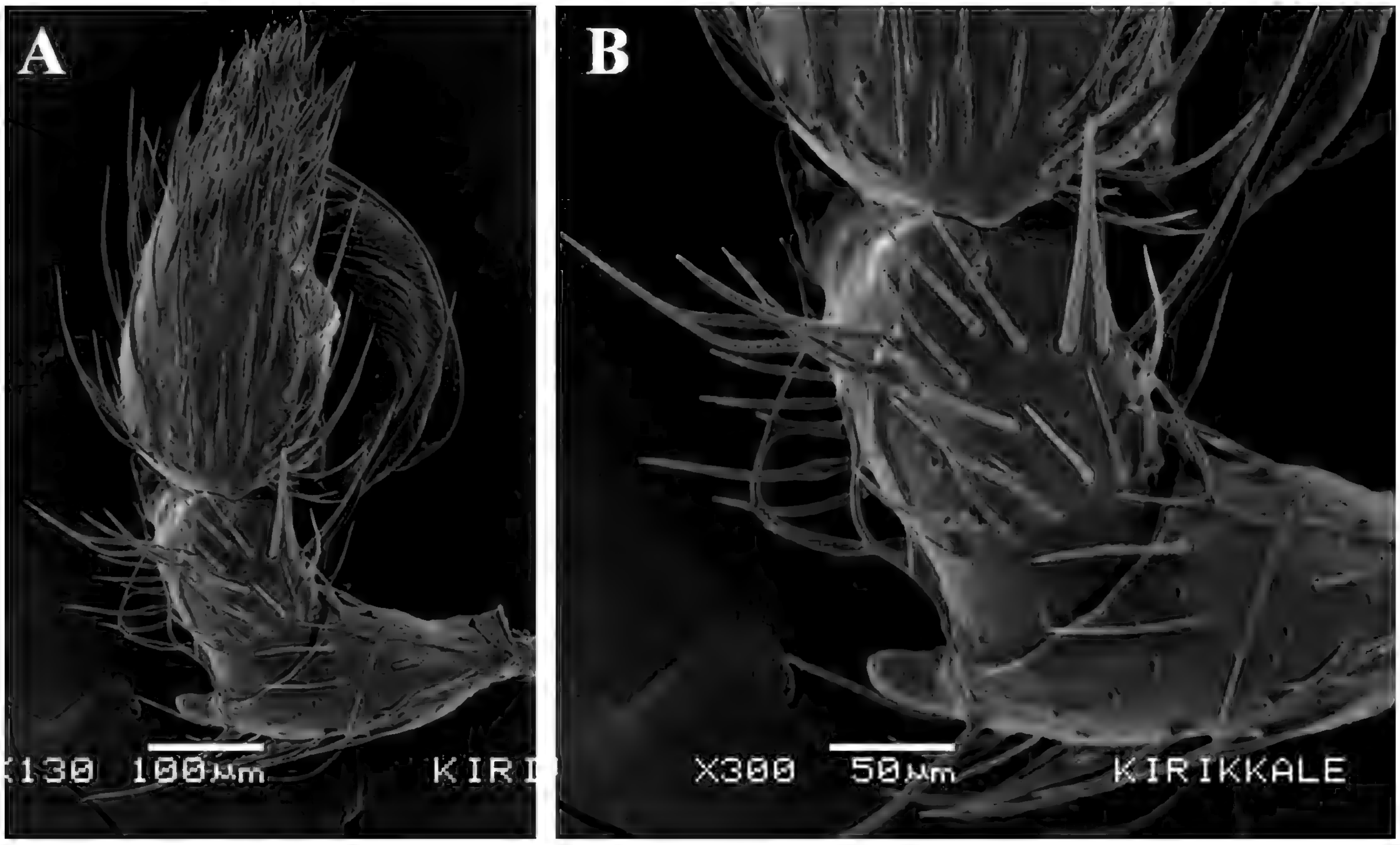

Fig. 6. *Synaphosus trichopus* (Roewer, 1928) ♂, SEM micrographs of pedipalp. A. retrolateral view. B. tibial and patellar apophyses, retrolateral view.

Distribution: Greece (incl. Crete) (World Spider Catalog, 2020).
Description of male: Total length 3.6. Prosoma 1.6 long, 1.2 wide. Abdomen 2.0 long, 1.1 wide. Prosoma yellowish brown, darker around the anterior median eyes. Abdomen pale greyish brown, with grey marks dorsally. Sternum yellowish brown, walking legs pale yellow (Fig. 4). Leg formula: IV-I-II-III. Lengths of legs segments: leg I. 3.3 (Fe: 1.0, Pa: 0.5, Ti: 0.8, Mt: 0.5, Ta: 0.5). leg II. 3.1 (Fe: 0.9, Pa: 0.5, Ti: 0.7, Mt: 0.5, Ta: 0.5). leg III. 2.7 (Fe: 0.9, Pa: 0.4, Ti: 0.5, Mt: 0.5, Ta: 0.4). leg IV. 4.6 (Fe: 1.2, Pa: 0.6, Ti: 1.0, Mt: 1.2, Ta: 0.6). Palpal retrolateral tibial apophysis small, pointed, with hooked end. In addition, the pedipalp contains a pointed retrolateral patellar apophysis extending to the retrolateral side that is bigger than retrolateral tibial apophysis. Embolus long and filiform shaped (Figs. 5-6).

Discussion

Although Marusik & Fomichev (2016) stated that there is no palpal median apophysis structure in the genus *Synaphosus*, when we look at the palpal formations of Turkish *Synaphosus* specimens using SEM, palpal structures that expressed as "MA?" in Chatzaki & Russell-Smith (2017) which were expressed as “folded median apophysis” according to Platnick & Shadab (1980), and “a part of conductor” according to Ovtsharenko *et al.* (1994), were also found in our samples.

In addition, comparing our Turkish *Synaphosus* specimens with Greek and Cypriot specimens (Chatzaki & Russell-Smith, 2017 and Chatzaki *et al.*, 2002), we did not observe remarkable differences in individual body measurements.

Acknowledgment

We wish to thank Kırıkkale University, Scientific and Technological Research Center (KUBTUAM) for the SEM facilities.

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Zelotes fulvaster (Simon, 1878) (Araneae: Gnaphosidae) is a new spider record from Turkey

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Abstract

The ground spider species *Zelotes fulvaster* (Simon, 1878) is recorded for the first time from Turkey. Its general habitus and genitalia are illustrated. Description and collecting data of this species are also given.

Keywords: Araneae, Gnaphosidae, *Zelotes fulvaster*, new record, Turkey.

Introduction

Gnaphosidae is now the largest spider family in Turkey. The known gnaphosid fauna of Turkey includes 148 species and 33 genera (Demir & Seyyar, 2017; Seyyar *et al.*, 2019a, b, c). We collected only three male specimens of *Zelotes fulvaster* (Simon, 1878) from Turkey. The aim of this paper is to present this species as a new record for the Anatolia.

Material and Methods

In this study, only three males of *Zelotes fulvaster* (Simon, 1878) were collected from Gümüşhane Province (Kelkit Valley) in Turkey (Fig. 1). Examined specimens were preserved in 70% ethanol and deposited in the Niğde Ömer Halisdemir University Arachnology Museum (NOHUAM). Depending on Senglet (2011) the identification was made by means of a SZX61 Olympus stereomicroscope. All measurements are in millimetres.

Fig. 1. Locality of *Zelotes fulvaster* (Simon, 1878) in Turkey (Gümüşhane, Kelkit Valley).

Results

Zelotes fulvaster (Simon, 1878) Figs. 2-3.

Taxonomic references
Prosthesima fulvastra Simon, 1878: 96, pl. 14, f. 30 (D♀).
Zelotes fulvaster Simon, 1914: 168, 219, f. 345 (♀).
Zelotes fulvaster Jézéquel, 1962: 603, f. 26 (♀).
Zelotes tenuis Deltshev, 2004: 72, f. 9-10 (♂, misidentified).
Zelotes tenuis Kovblyuk, 2005: 10, f. 6.1-3, 7.3-4 (♂♀; misidentified).
Zelotes fulvaster Senglet, 2011: 522, f. 32-39, 75 (♂♀).

Distribution: France (Corsica), North Macedonia, Greece, Iran (World Spider Catalog, 2020).

Collected specimens: Gümüşhane Province: Şiran district, Seydibaba village, around the Tomara fall (40°06'20.95"N, 36°02'42.28"E), 1540 m, (30.V.2019), (3♂♂). Leg. Hakan Demir & Osman Seyyar.

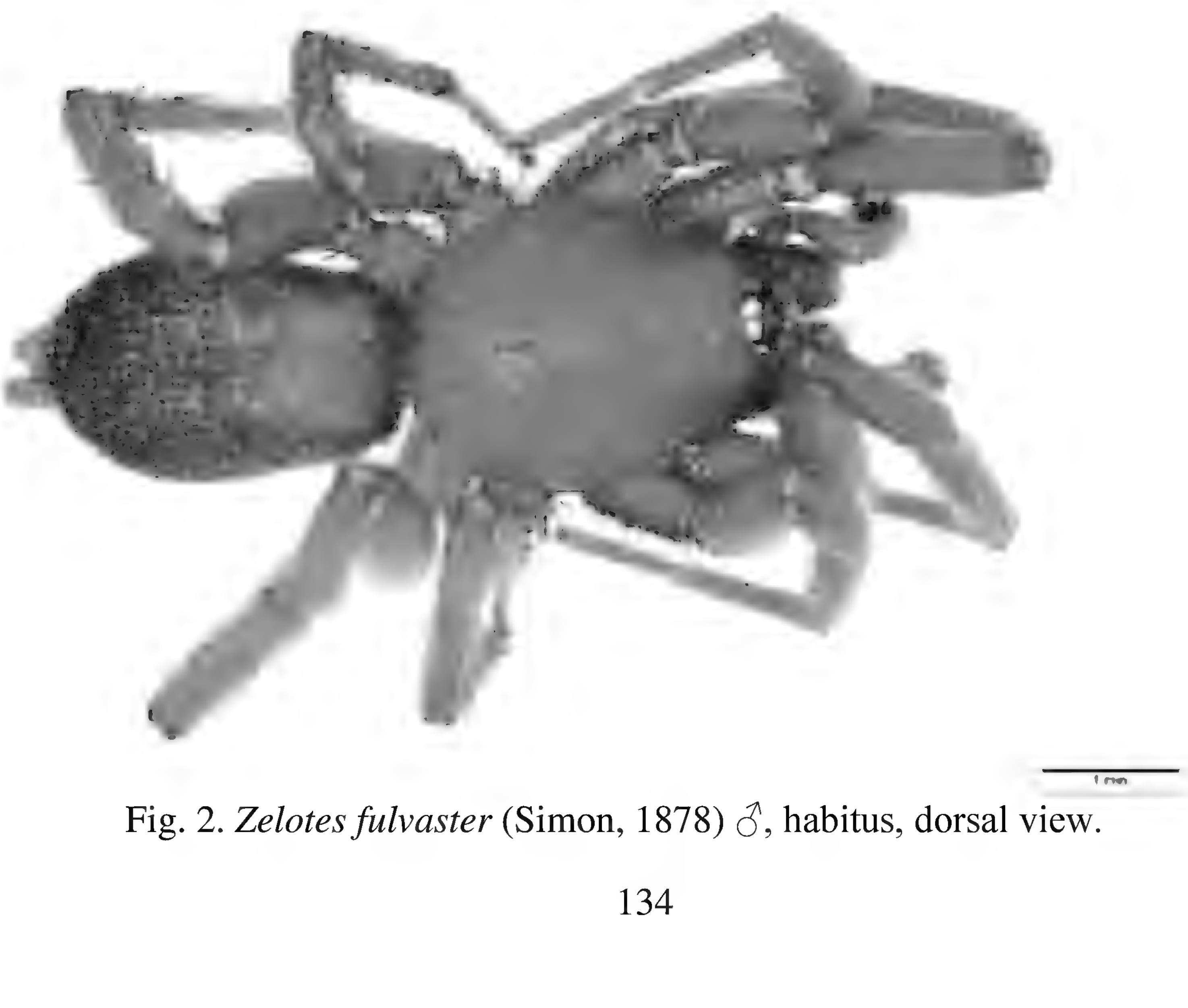

Fig. 2. *Zelotes fulvaster* (Simon, 1878) ♂, habitus, dorsal view.

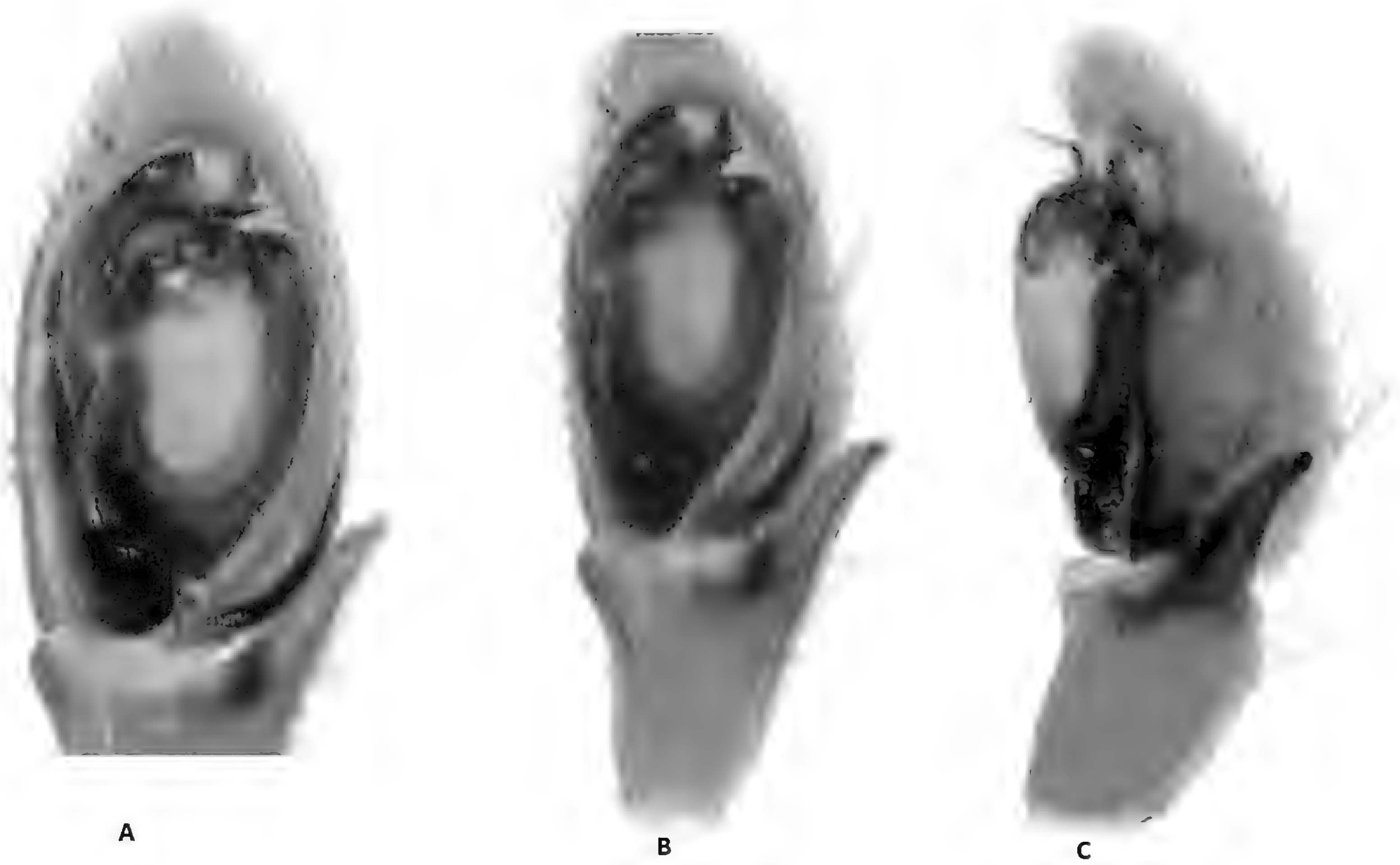

Fig. 3. *Zelotes fulvaster* (Simon, 1878) ♂, palp. A-B. ventral view. C. retrolateral view.

Acknowledgment

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First report of the lynx spider *Oxyopes sertatus* L. Koch, 1878 (Araneae: Oxyopidae) from India

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Abstract

The lynx spider species, *Oxyopes sertatus* L. Koch, 1878, was previously reported from China, Korea, Taiwan, and Japan. In this paper, we report this species for the first time from India based on a female specimen from Odisha.

Keywords: First report, *Oxyopes sertatus*, taxonomy, India.

Introduction

The lynx spider family Oxyopidae Thorell, 1870 is a small family comprising of nine genera and 437 species in the world; of which, 80 species under four genera *viz*., *Hamadruas* Deeleman-Reinhold, 2009, *Hamataliwa* Keyserling, 1887, *Oxyopes* Latreille, 1804 and *Peucetia* Thorell, 1869 have been reported from India (Gajbe, 2008; World Spider Catalog, 2020). The genus *Oxyopes* is a diverse group with worldwide distribution that includes 280 species and 5 subspecies from all over the world (World Spider Catalog, 2020); of which, 52 species have been reported from India (Gajbe, 2008; World Spider Catalog, 2020). In this paper we report *Oxyopes sertatus* L. Koch, 1878 for the first time from India based on a female specimen. This species was previously reported from China, Korea, Taiwan, and Japan (Koch, 1878; Lee, 1966; Xie & Kim, 1996; Namkung, 2003; World Spider Catalog, 2020).

Material and Methods

The specimen was collected by hand picking method and preserved in 70% ethyl alcohol with little glycerine. Measurements of body parts, except for the eyes, were taken with a Mitutoyo™ vernier caliper. Eye measurements were done with calibrated ocular micrometer. Legs and pedipalp measurements were taken dorsally for the left side. All measurements are in millimetres. Genitalia were dissected and cleared in concentrated lactic acid in 100ºC water bath for 15-20 minutes. All illustrations were prepared with the help of a drawing attachment attached to an Olympus SZX10 stereomicroscope.

Abbreviations: ALE = anterior lateral eye, AME = anterior median eye, PLE = posterior lateral eye, PME = posterior median eye. Abbreviations used for spines count are: d = dorsal, fe = femur, mt = metatarsus, p = prolateral, pa = patella, r = retrolateral, ti = tibia, v = ventral.

Taxonomy

Oxyopidae Thorell, 1870

Oxyopes Latreille, 1804

Oxyopes sertatus L. Koch, 1878

Material examined: 1♀, (CUO-ARA-31): Kantabaushuni Sacred Grove, Sindhipar Village, Semiliguda, Koraput, Odisha, India (18°45′37.58"N, 82°53′34.26"E, 900 m MSL), 12 February 2015, coll. Kritish De. Specimen was deposited at Central University of Odisha Museum (CUOM), Koraput, Odisha, India.

Description (Figs. 1-5):

Female: Total length 12.1, Cephalothorax length 4.0, width 2.5, Abdomen length 8.1, width 3.2.

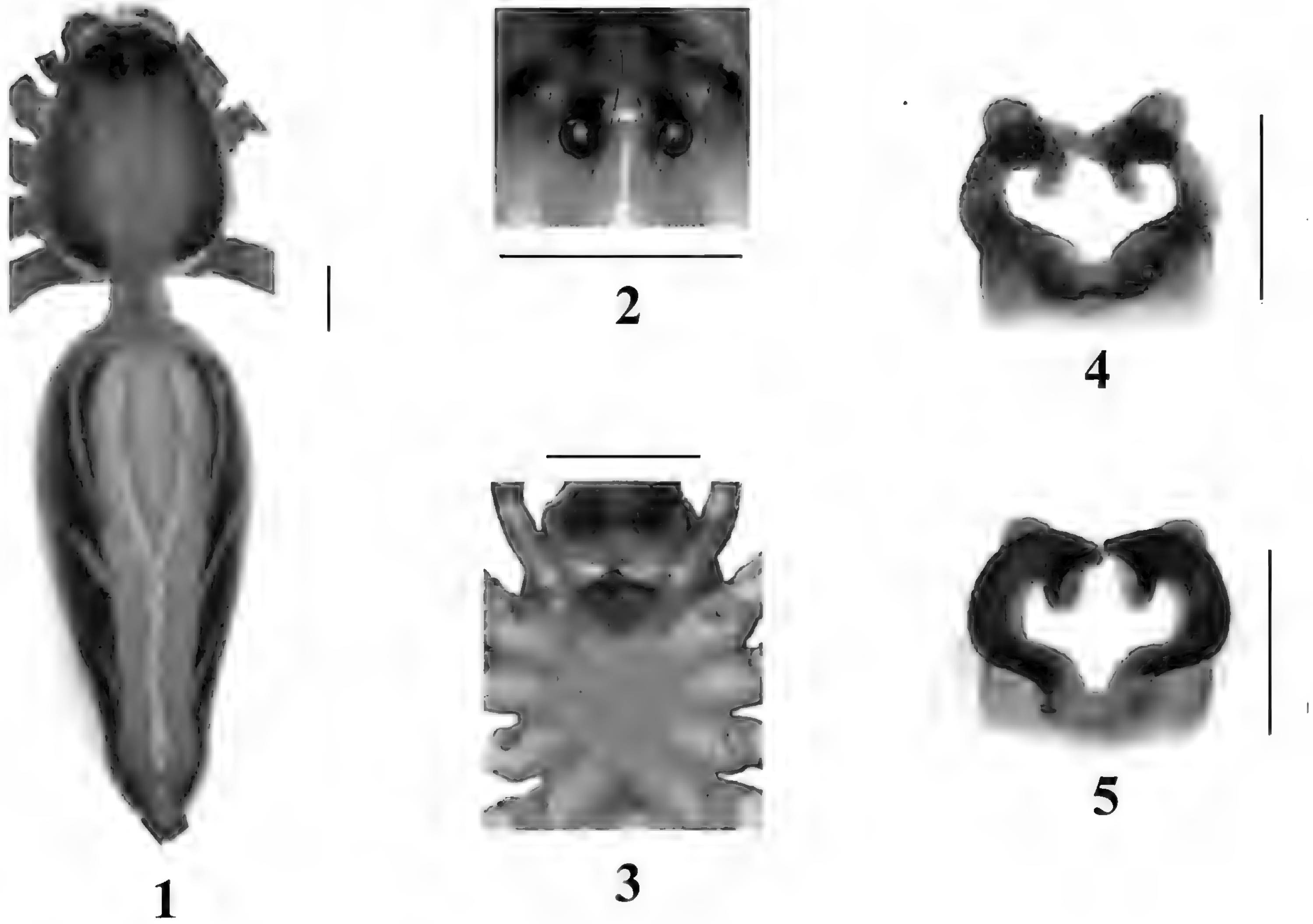
Cephalothorax (Figs. 1-3) longer than wide, yellowish brown, fringed with golden median and black lateral longitudinal stripes. Eight eyes, black, anterior row of eyes strongly recurved, medians much smaller than laterals and nearly equidistant from each other, posterior row of eyes strongly procurved, equal in size and equidistant from each other, anterior laterals and posterior row of eyes form a hexagon, all with black rim around them, ocular quad longer than wide. Eye diameters and inter-distances: AME 0.13, ALE 0.25, PME 0.25, PLE 0.22, AME–AME 0.09, PME–PME 0.34, PME-PLE 1.04. Chelicerae short, both promargin and retromargin with single tooth. Labium and endites slender, yellowish, covered with dark hairs, endite elongated, anteriorly converge and with scopula. Sternum heart shaped, cordate, yellowish, clothed with scattered long, black, erect hairs. Abdomen longer than wide, dorsally yellowish brown, with three silvery lateral stripes on each side, anteriorly and medially with a lanceolate mark having silvery border that continues as a narrow silvery medial stripe posteriorly. Ventral side greenish yellow having one longitudinal light green medial stripe that runs from epigastric furrow and ends before spinnerets.

Legs long, strong, yellowish and clothed with spines. Leg measurements (femur, patella, tibia, metatarsus, tarsus, total): Leg I: 4.3, 1.3, 3.8, 4.0, 1.8, 15.2; Leg II: 4.0, 1.3, 3.7, 4.0, 1.5, 14.5; Leg III: 3.9, 1.2, 3.1, 3.3, 1.2, 12.7; Leg IV: 4.1, 1.2, 3.4, 4.4, 1.3, 14.4; Leg formula 1243. Spines, I: fe, d=3, p=3, r=3; pa, d=2, r=1; ti, d=2, p=3, r=3; mt, d=4, v=1, p=4, r=3, II: fe, d=3, p=2, r=3; pa, d=2, p=1, r=1; ti, d=2, p=3, r=3; mt, d=3, v=1, p=3, r=3, III: fe, d=4, p=2, r=3; pa, d=2, r=1; ti, d=2, p=2, r=3; mt, v=1, p=4, r=3, IV: fe, d=3, p=2, r=1; pa, d=2, r=1; ti, d=3, p=2, r=3; mt, d=3, v=1, p=4, r=3.

Spinnerets in three pairs, brownish, posterior median spinnerets smallest and hidden between anterior and posterior lateral spinnerets.

Epigyne (Figs. 4-5): Copulatory openings on each side sclerotized. Spermathecae ampullar-shaped, copulatory ducts curved question mark-like, prominent and opens laterally. The species exhibits epigynal dimorphism (Yoshikura, 1984; Yin *et al.*, 2012).

Distribution: China, Korea, Taiwan, Japan (World Spider Catalog, 2020) and India (Odisha, present record).



Figs. 1-5. *Oxyopes sertatus* ♀. 1. Habitus, dorsal view. 2. Eye arrangement. 3. Sternum, endites and labium. 4. Epigyne, ventral view. 5. Internal genitalia, dorsal view. (Scale: 1 mm [1-3], 0.5 mm [4-5]).

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Predation of a large orb-web spider by a crab spider, *Thomisus labefactus* (Araenae: Thomisidae)

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Abstract

In the present study, I reported that the female adult crab spider *Thomisus labefactus* preyed on a female adult of the wasp spider *Argiope bruennichi* in the centre of the web. To my knowledge, the case that a large orb-weaving spider *A. bruennichi* is fed upon by the crab spiders with web-invading is not known previously. It has been shown that *T. labefactus*, considered commonly as a sit-and-wait predator, also aggressively hunt *A. bruennichi*, the large web-building spider, attacking its prey at the centre of web.

Keywords: Araneae, Araneophagy, Web-invading.

Introduction

The crab spider, Thomisidae species, is a sit-and-wait (ambushing) predator commonly found on flowers (e.g. Morse, 1984). Huseynov (2007) reported that *Thomisus onustus* Walckenaer, 1805 is a common polyphagous crab spider in Palaearctic realm, where it primarily captures Diptera and Hymenoptera (94.2% of total prey). It has been also revealed that *T. onustus* attacked species which are about twice the size of the spider itself. The crab spider also feed upon other spiders. Some spiders are araneophagic, i.e., they prey on other spider individuals (e.g. Jackson & Wilcox, 1998). Araneophagic cases by *T. onustus* were described that there were six individuals of Arachnida (Araneae), five of Thomisidae and one of Theridiidae. In these cases, all of the six spiders were cursorial and non-orb-weavers (Huseynov, 2007).

In Japan, Korea, and China, *Thomisus labefactus* Karsch, 1881 is a common crab spider (Ono & Ogata, 2018). Shinkai (2010) reported that *T. labefactus* preyed on a

female orb-web spider, *Neoscona mellotteei* (Simon, 1895), without entering into the web. A photograph has shown that *T. labefactus* captured *Trichonephila clavata* (L. Koch, 1878) without web invasion (Ono & Ogata, 2018). From these reports, *T. labefactus*, a sit-and-wait (ambushing) predator, also hunt web-building spiders unlike *T. onustus*.

In the present report, I report that *T. labefactus* captures an adult female orb web spider *Argiope bruennichi* (Scopoli, 1772) at the centre of the web. The body size of the spider was also estimated. The spider *T. labefactus* observed in the present study could be considered to be the first report to prey on *A. bruennichi*, a large web-building spider, in terms of the web-invading behaviour. Such an invasion into the centre of web of *A. bruennichi* by the crab spider has rarely been observed. The wasp spider *A. bruennichi* has observed to be attacked by the European hornet *Vespa crabro* Linnaeus, 1758 (e.g. Bruggisser *et al.*, 2012), birds such as *Parus major* Linnaeus, 1758 and *Phoenicurus auroreus* (Pallas, 1776) (Wang *et al.*, 1995), and mantis *Tenodera sinensis* (Saussure, 1871) (Ono & Ogata, 2018).

Material and Methods

The observations of the predation were carried out in the Bunkyo Campus at Nagasaki University. The photographs were taken using a Canon digital camera IXY 630 (Tokyo, Japan).

Fig. 1. *Thomisus labefactus* preyed on *Argiope bruennchi* in its centre of the web.

Results and Discussion

I observed that an adult female *T. labefactus* preyed on an adult female *A. bruennichi* in the centre of the web on azalea (*Rhododendron* sp.) plant at 17:14 pm on October 31, 2019 (Fig. 1). Though the hunting was already complete as at the time of the observation, the same place was visited the following day at 15:36 (November 1, 2019), and *T. labefactus* was observed to still be foraging on the prey. Further observation revealed that *T. labefactus* dropped the dead individual of *A. bruennichi* from the web and walked out along the radial thread. From three photographs (two individuals were not overlapped each other) taken on November 1, body sizes ratio was measured by ruler and mean ratio was determined to be 206%.

To my knowledge, it has not been reported previously in published articles that *A. bruennichi* was attacked by a crab spider with web-invasion. The movement behaviour of *T. labefactus* on the radial threads was cautious, and the reason may be the fact that crab spiders are not web-building spiders; rather, they are cursorial and ambushing predators.

This raises the question that how could *T. labefactus* spider invade the web and defeat an orb-weaver? *T. labefactus* probably invaded the web by jumping, as this species usually do when hunting on flowers. Perhaps *T. labefactus* could utilize the web to invade into the centre of web like spiders of *Argyrodes* sp., also called dewdrop spiders, which are known to be kleptoparasitic, i.e., they steal host spiders' prey, invade, and reside in their host's web (e.g. Whitehouse, 1988). In order to prey a large spider aggressively, strong venom components that *T. labefactus* must have would contribute to paralyze the victim effectively. The venom composition of *T. labefactus* is not studied yet (Kuhn-Nentwig *et al.*, 2011; Pineda *et al.*, 2018), so further research about toxins will be of interest.

Why couldn't *A. bruennichi* do prevent the attack by *T. labefactus*? *A. bruennichi* is known as a species that specialized in catching large sized invertebrates, mainly grasshoppers (Acrididae species) (e.g. Szymkowiak *et al.*, 2005). Crab spiders are usually smaller than *A. bruennichi*, so the specialized tactics that *A. bruennichi* spiders have in catching larger preys may do not function to avoid crab spiders. This may explain why *T. labefactus* could deceive large orb-building spider such as *A. bruennichi*.

Argiope bruennichi, one of the large web-building spiders, was preyed on by *T. labefactus*, which is believed to be a sit-and-wait predator, with web-invasion. In the context of tactics that crab spiders hunt other spiders, the web-invading behaviour to prey large orb-weavers aggressively described herein will be an important step to further understanding ecology of sit-and-wait predators in their foraging behaviours. In the meaning of taking risk for crab spiders to prey large web-building spiders with web-invading, it will be a challenging task to clarify the flexibility and versatility of araneophagy in the future.

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First record and description of a new species of *Leiurus* Ehrenberg from Kuwait (Scorpiones: Buthidae)

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Abstract

A new species of buthid scorpion belonging to the genus *Leiurus* Ehrenberg is described based on a single female collected in the region of Al-Abraq – Al-Khabari farms in Kuwait. The new species, *Leiurus kuwaiti* sp. n., shows affinities with *Leiurus hebraeus* (Birula, 1908) species distributed mainly in Jordan and Israel. The populations from Kuwait and Jordan/Israel apparently are totally isolated by a large and dry region now occupied by the An Nafud desert. Therefore in account of the disrupted distribution and some minor morphological differences presented by the two populations, a new species is proposed to accommodate the population from Kuwait. Further investigations should bring more precise conclusions about the status of these two populations. The type locality of the new species represents the most easterly record of the genus *Leiurus* in the North range of the Arabian Peninsula and represents the first confirmed record of the genus for Kuwait.

Keywords: Scorpion, new species, *Leiurus kuwaiti*, Buthidae, Kuwait.

Introduction

In several previous publications (Lourenço, 2019; Lourenço *et al.*, 2002, 2006, 2018; Lourenço & Rossi, 2016), most aspects concerning the history and taxonomic evolution of the genus *Leiurus* Ehrenberg, 1828 were largely discussed and will not be further treated here. A rather complete contribution was proposed by Lowe *et al.* (2014); in their very extensive article, these authors attempted to bring a full revision of the genus *Leiurus*, but dealing mainly with the populations from the Arabian Peninsula. The status

of some old species was revalidated, one recently described species was placed in synonymy, one subspecies was raised to species and four new species were described. In their study, the distribution range of the genus was not confirmed for Iraq and Kuwait, as previously suggested by Fet & Lowe (2000).

In this article, a new species of *Leiurus* is described from Kuwait, representing the first clear record of this genus for this country. The new species shows affinities with *L. hebraeus* (Birula, 1908) mainly distributed in Jordan and Israel. The two populations are apparently totally isolated by a large and dry region now occupied by the An Nafud desert. Both species may correspond to vicariant elements which in past less arid periods knew a larger range of distribution over the Arabian Peninsula, now isolated by aridification.

Methods

Illustrations and measurements were obtained using a Wild M5 stereo-microscope with a drawing tube and ocular micrometer. Measurements follow Stahnke (1970) and are given in mm. Trichobothrial notations follow Vachon (1974) and morphological terminology mostly follows Vachon (1952) and Hjelle (1990).

Taxonomic treatment

Family Buthidae C.L. Koch, 1837

Genus *Leiurus* Ehrenberg, 1828

Leiurus kuwaiti sp. n. (Figs. 1-8)

Type material: Kuwait, Al-Abraq – Al-Khabari farms (29.3683ºN – 46.9610ºE, 235 m, 28/IV/2008 (Ph. Geniez). Female holotype will be deposited in the Muséum national d'Histoire naturelle, Paris. Holotype collected together with 2 pre-adults, male and female, and one male juvenile of *Androctonus crassicauda* (Olivier, 1807), also deposited in the Muséum in Paris.

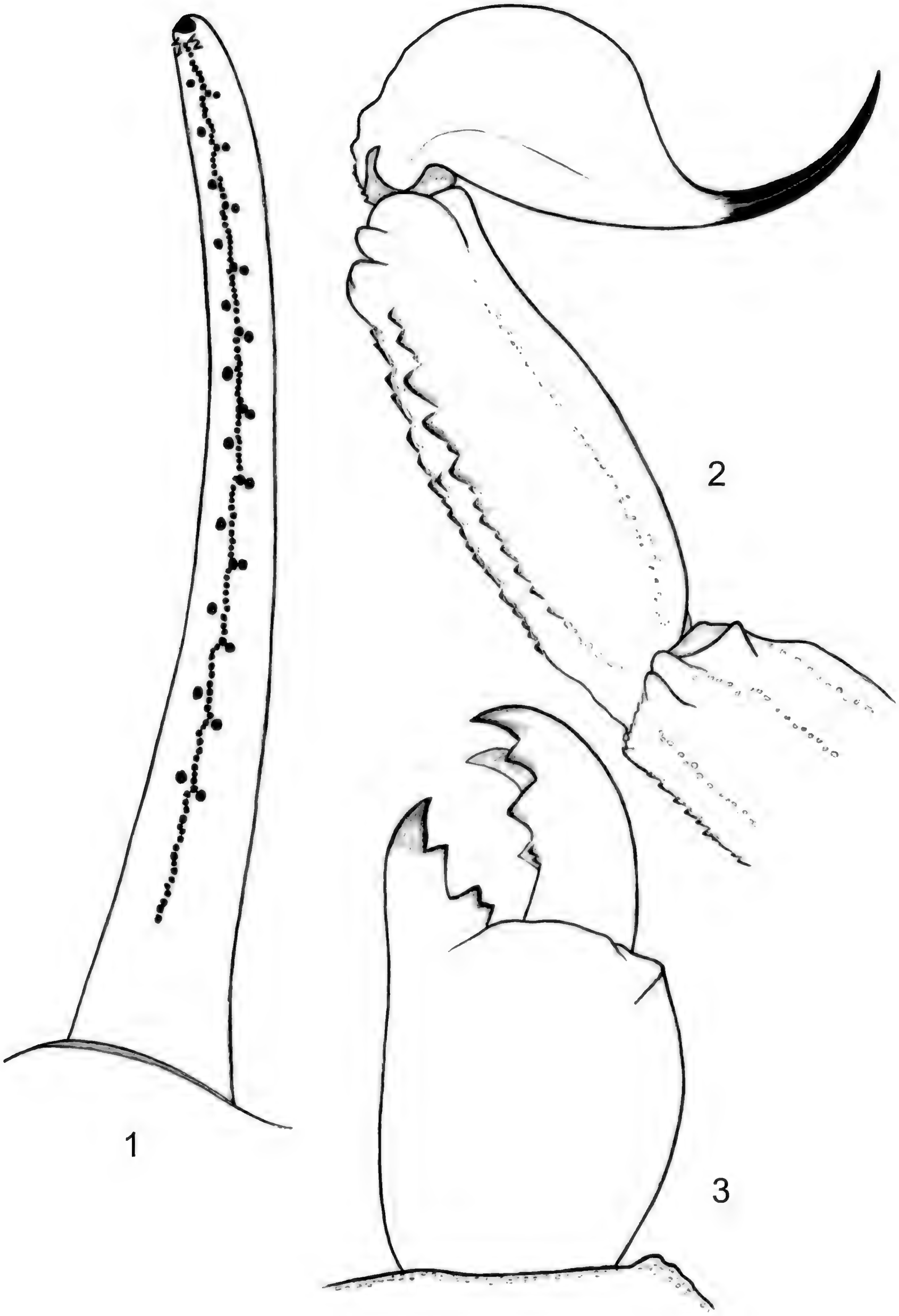
Etymology: specific name is placed in apposition to the generic name and refers to the Kuwaitis, inhabitants of Kuwait.

Diagnosis: Scorpion of moderate to large size when compared with the other species of the genus, having a total length of 75.0 mm for female. Ground colour yellow to pale yellow with the body and pedipalps almost totally yellow. Female carapace pale yellow with only some infuscations over the ocular tubercle; metasomal segment V strongly infuscate to dark; other metasomal segments yellow to pale yellow. Ocular tubercle moderately prominent. Pectines with 30-31 teeth for female. Median carinae on sternites III-IV weakly marked; sternite VII with mediate intercarinal surface presenting a very thin granulation. Pedipalp fingers with 12-12 rows of granules for female. Chela trichobothrium *db* vs *est* in a distal position.

Description based on female holotype (Morphometric measurements following the description).

Colouration. Ground colour yellow to pale yellow; body and pedipalps almost totally yellow to pale yellow; legs pale yellow. Carapace pale yellow with some weak infuscations over the ocular tubercle. Mesosoma tergites pale yellow including carinae. Metasoma yellow to pale yellow on segments I to IV; segment V almost totally infuscate to dark, except only for the most posterior zone. Vesicle yellow with reddish tonalities on lateral sides; aculeus yellow at the base and dark red at its extremity. Venter yellow with some reddish tonalities. Chelicerae yellow without any dark reticulated spots; teeth dark

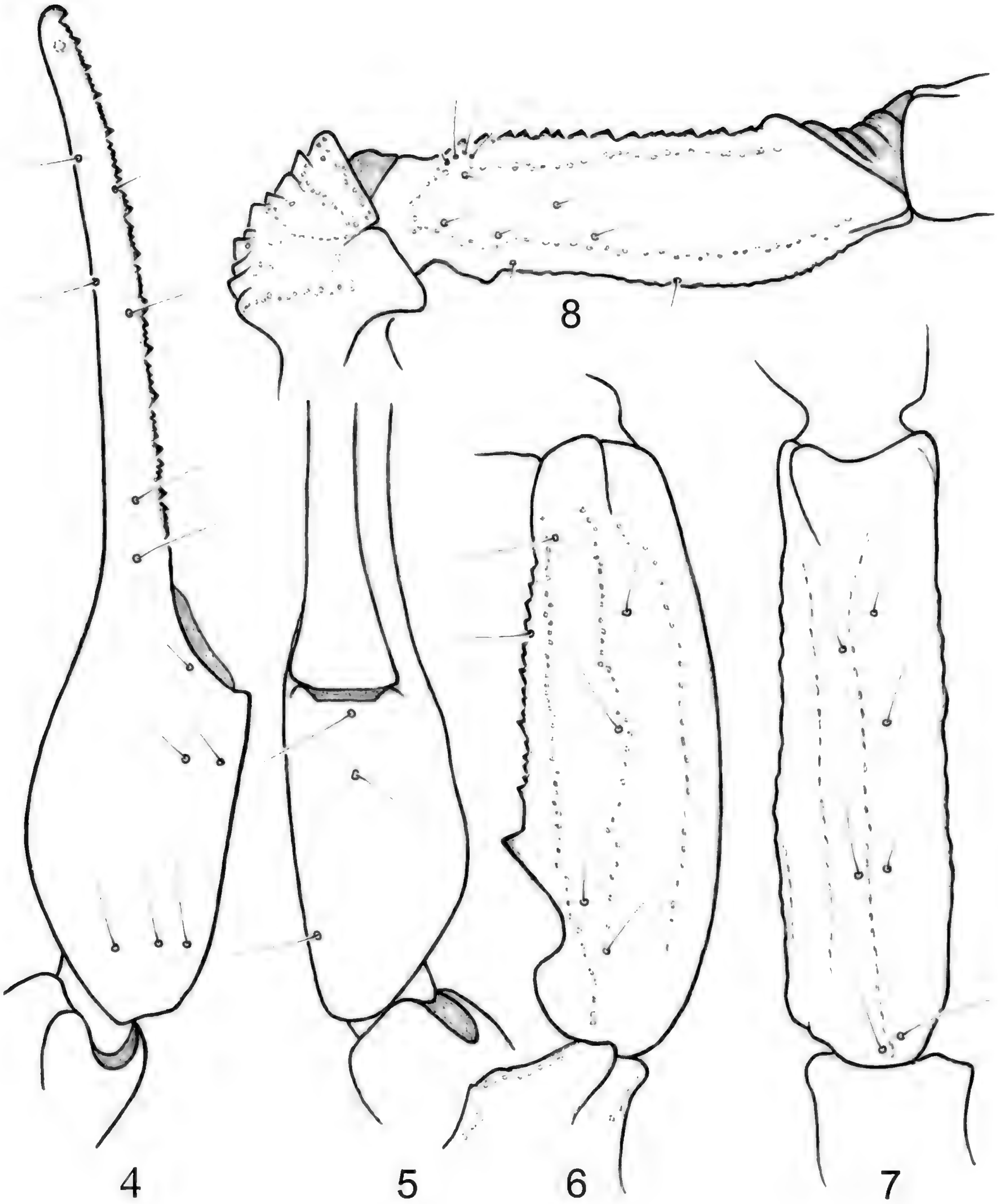
red. Pedipalps yellow to pale yellow overall except for the rows of granules on chela fingers which are reddish. Legs pale yellow.



Figs. 1-3. *Leiurus kuwaiti* sp. n. Female holotype. 1. Cutting edge of movable finger, showing rows of granules. 2. Metasomal segment V and telson, lateral aspect. 3. Chelicera, dorsal aspect.

Morphology. Prosoma: Anterior margin of carapace with a weak concavity. Carapace carinae moderately developed; central median and posterior median carinae moderate; anterior median carinae moderate to weak; central lateral moderate; posterior median carinae moderate, terminating distally in a small spinoid process that extends very slightly beyond the posterior margin of the carapace. Intercarinal spaces with few irregular granules, and the reminder of the surface almost smooth, in particular laterally and distally. Median ocular tubercle in a central position and moderately prominent; median eyes moderate in size and separated by two and half ocular diameters. Four/five pairs of lateral eyes; the fourth and fifth are reduced. Mesosomal tergites I-II pentacarinate; III-VI tricarinate. All carinae moderate to strong, granular; each carina terminating distally in a spinoid process that extends slightly beyond the posterior margin of the tergite. Median carinae on I moderate, on II-VI strong, crenulated. Tergite VII pentacarinate, with lateral pairs of carinae strong and fused; median carinae present on the proximal half, moderate. Intercarinal spaces weakly granular. Lateral carinae absent from sternite III; moderate to strong on sternites IV-VI; strong, crenulate on VII; median carinae on sternites III-IV weak. Pectines moderately long; pectinal tooth count 30-31 on female holotype. Metasomal segments I-III with ten carinae, moderately crenulate; lateral inframedian carinae on I moderate; on II present on the posterior half; on III limited to a few posterior granules; IV with eight carinae. Dorsal and dorsolateral carinae moderate, without any enlarged denticles distally. All the other carinae moderate to weak on segments I-IV. Segment V with five carinae; ventromedian carinae with several globular granules distally; anal arch with three rather globular lobes. Dorsal furrows of all segments weakly developed and smooth; intercarinal spaces almost smooth, with only a few granules on the ventral surface of segment V. Telson smooth; subaculear tubercle absent; aculeus slightly shorter than vesicle. Chelicerae with two reduced denticles at the base of the movable finger almost fused (Vachon, 1963). Pedipalps: Trichobothrial pattern orthobothriotaxic, type A (Vachon, 1974); dorsal trichobothria of femur in β (beta) configuration (Vachon, 1975). Chela *db* vs *est* in a distal position. Femur pentacarinate; all carinae moderately to weakly crenulate. Patella with seven carinae; all carinae weakly crenulate; dorsointernal carinae with 3-4 slightly spinoid granules. Chelae slender, with elongated fingers; all carinae weakly marked, almost vestigial. Dentate margins of fixed and movable fingers composed of 12-12 almost linear rows of granules. Legs: Ventral aspect of tarsi with short spiniform setae more or less arranged in two rows. Tibial spurs present on legs III and IV, strongly marked. Pedal spurs present on all legs, strongly marked.

Relationships. Based on the key supplied by Lowe *et al.* (2014), the new species clearly presents affinities with *L. hebraeus*, normally only distributed in Jordan and Israel (Levy *et al.*, 1970; see also fig. 9). Nevertheless, the characters used by these authors to define the species, as well as the proposed dichotomic key are rather difficult to be used. The two species probably represent vicariant elements (see also biogeographic comments). Morphological differences are not strongly marked, but some distinctive characters can be numbered: (i) distinct patterns of pigmentation, the species from Kuwait shows a paler overall colour and has the metasomal segment V strongly pigmented, (ii) some distinct morphometric values for specimens of a similar global size; in the new species the values for pedipalps patella and chela L/W are 3.17 and 5.85 respectively suggesting more elongated pedipalps (iii) in the new species the ocular tubercle is only moderately prominent.



Figs. 4-8. *Leiurus kuwaiti* sp. n. Female holotype. Trichobothrial pattern. 4-5. Chela, dorso-external and ventral aspects. 6-7. Patella, dorsal and external aspects. 8. Femur, dorsal aspect.

Morphometric values of the female holotype of *Leiurus kuwaiti* sp. n. Total length including the telson, 75.0. Carapace: length 8.4; anterior width 6.2; posterior width 9.8. Mesosoma length: 19.4. Metasomal segments. I: length 6.0, width 5.3; II: length 7.0, width 4.7; III: length 7.3, width 4.4; IV: length 8.4, width 4.2; V: length, 9.9, width 4.0, depth 3.6. Telson length 8.6; vesicle: width 3.8, depth 3.6. Pedipalp: femur length 8.1, width 2.4; patella length 9.5, width 3.0; chela length 15.8, width 2.7, depth 2.8. Movable finger length 10.9.

Biogeographic considerations

In a recent paper the possible existence of vicariant species was discussed for two isolated population of *Mesobuthus nigrocinctus* (Ehrenberg, 1828) in Syria.

The isolation of these two populations was suggested as a process directly in connexion with the aridification of the Syrian Desert (Lourenço, 2020). This ongoing process was suggested to be related to the continuous process of adjustment of the geomorphologic system to the interglacial climate and has been active mainly since the termination of the last glacial phase in the Late Pleistocene.

Similar palaeoclimatic events most certainly took place also in the Arabian Peninsula. According to Kingston & Hill (1999), the study of fossil material, even if limited, when viewed in the context of the late Miocene palaeoenvironments can provide significant evidence that the region did not present a continuous ecological barrier to intercontinental exchange. The analyses of lithofacies and associated fauna and flora indicate an open woodland environment adjacent to a major river system and perhaps even grasslands. In contrast with the widespread semi-arid to hyperarid conditions that dominate the Arabian Peninsula today, the environment during the late Miocene may have been more varied and supported a number of different types of habitats (Kingston & Hill, 1999; see also Lourenço, 2020). Therefore, it may be suggested that in past geological times the possible today isolated populations of *Leiurus* (Fig. 9) formed a contiguous unique population. Only further studies, however, will be in measured to clarify the precise status of these supposedly distinct populations.

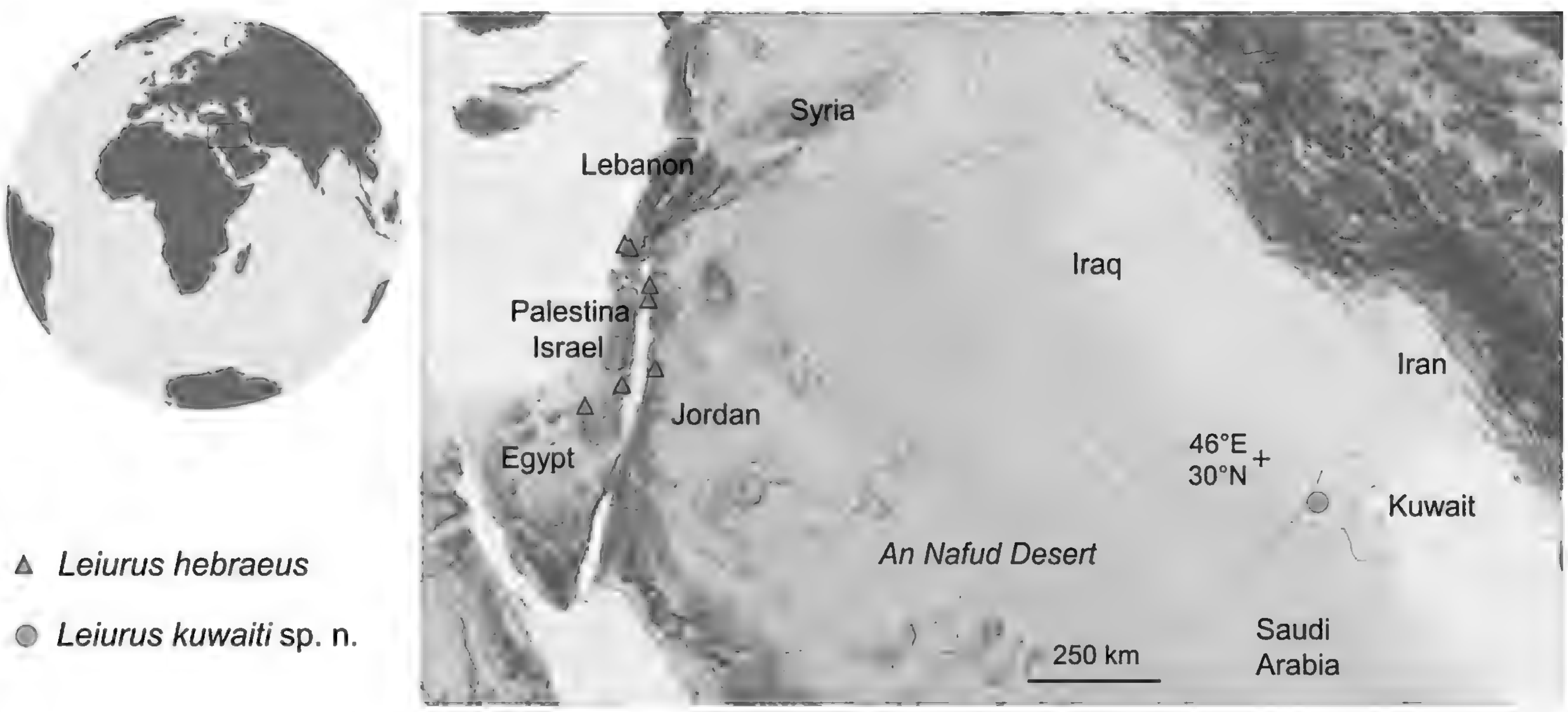


Fig. 9. Map of Middle East, showing the known distributions of *Leiurus hebraeus* (modified from Lowe *et al.*, 2014) and *Leiurus kuwaiti* sp. n.

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***Leiurus kuwaiti* Lourenço, 2020**
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Biological control of *Tetranychus urticae* infesting eggplant and squash cultivations using the comb-footed spider *Latrodectus geometricus*

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Abstract

The spider, *Latrodectus geometricus* C.L. Koch, 1841 was evaluated as potential biological control agent for the two-spotted spider mite, *Tetranychus urticae* C.L. Koch, 1836 on two cultivations of eggplant and squash. Releases of different numbers of the spiders per plant resulted that *L. geometricus* reduced the numbers of *T. urticae* in the two cultivations of eggplant and squash. The earlier release, average from 5-15 individuals/leaf, resulted in reducing *T. urticae* numbers and lowering their damage, concluding that the release of *L. geometricus* is a potentially useful *T. urticae* management strategy, but it needs improvements in release timing and strategy to provide commercially acceptable control.

Keywords: Biological control, *Tetranychus urticae*, *Latrodectus geometricus*.

Introduction

Spiders represent one of the most important natural predatory groups in the Egyptian fields. Eggplant, *Solanum melongena* L. (Family Solanaceae) and Squash, *Cucurbita pepo* L. (Family Cucurbitaceae) are important vegetables cultivated in both open fields and under greenhouses for local consumption and for exportation to the foreign markets. Their cultivations are attacked by several phytophagous mites and insect species, which cause great economical losses to many crop species all over the world

(Abdallah *et al.*, 2002; Ragkou *et al.*, 2004). The serious pest that attacks plants, the two-spotted spider mite *Tetranychns urticae* C.L. Koch, 1836 (Acari: Tetranychidae) feeds by sucking the plant sap (one mite can feed on 18 to 22 plant cells in 1 minute). This species covers the leaves with a mass of silken webbing (Abdallah, 2002). It has been recorded feeding on approximately 1200 described plant species in 70 genera (Ragkou *et al.*, 2004). Estimation of the liability of squash to infestation with several pests especially under the greenhouses in order to select the most resistant one to avoid using any chemical to control these pests. There were several studies on the host plant resistance to the infestation by *T. urticae* such as: Iskandar *et al.* (2002) on pepper, El-Saiedy (2003) on two different strawberry kinds, and Abou-Zaid (2007) on five different cucumber cultivars. They attributed this phenomenon to the chemical contents of plant tissue (Kielkiewicz *et al.*, 1983) or to physical factors as leaf trichomes morphological structure (Kielkiewicz *et al.*, 1983). Induced resistance can result from an environmental change that may lead to temporary benefit of the host plant. The application of fertilizers, mineral nutrients can change the chemical constituents of plant tissue and consequently their nutritional value for pests (Ibrahim, 1988). Painter (1951) defined tolerance as a resistance in which the plant shows an ability to grow and reproduce or to require pest injury to a marked degree in spite of supporting as insect population early equal to that damaging in susceptible host. Dahms (1972) identified 16 possible criteria to evaluate pest resistance in plants among which the number of pest motile stages attracted to cultivars when given a free choice.

The present investigations were carried out to evaluate the predatory ability of the spider species and calculate the reduction percentage in the lesion population. This may be the first step to get benefit of *Latrodectus geometricus* C.L. Koch, 1841 as arthropod pests' predator and biological control agent.

Material and Methods

Experimental design.

The experiment field was consisted of three treatments and control. Each treatment area was consisted of four lines of 5 x 0.5 metres. Two cultivations of eggplant and squash were used separately. Plants were infected by lesions of *Tetranychns urticae* (5, 10, 15) individuals/leaf and control respectively. The predator spider *Latrodectus geometricus* was released at the rate of one spider/leaf. The experiment was conducted at the Faculty of Agriculture, Al-Azhar University, Nasr City, Cairo; in the period from July to November 2019, in a semi-field conditions, under temperatures with an average of 21 to 36°C.

Pest source

Individuals of the two-spotted spider mite, *Tetranychus urticae* C.L. Koch, 1836 were collected from infested cultures found in surrounding region of the experiment place.

Spiders collecting, rearing, and release

Spiders and their egg sacs were picked by hand. The big individuals were kept in translucent plastic vials (3 cm diameter and 5 cm height), supplied with suitable prey, kept under the room temperature, and reared until laying their eggs. The individuals were released immediately after hatching within the experiment field (Figs. 5-8).

Figs. 1-4. Control. 1-2. Eggplant leaves severely infected by the two-spotted spider mite, *Tetranychus urticae*. Individuals appear with their web. 3-4. Squash leaves severely infected by the two-spotted spider mite, *Tetranychus urticae*.

Sampling procedure

Samples were taken weekly for the three treatments and control on eggplant and squash. Twelve leaves were randomly collected, kept into polyethylene bags, tightly closed with rubber bands, then kept in an ice box and transferred to laboratory for examination using a stereomicroscope.

Statistical analysis

Obtained data were analyzed using Proc (ANOVA) in SAS (SAS Institute Inc, 2004). Means separation was conducted using LSD in the same statistical program.

Reduction Percentage of the mite population was calculated according to the equation of Henderson & Tilton (1955):

$$\text{Reduction} = 1 - \left(\frac{\text{Treatmernt before x control after}}{\text{Treatment after x control before}}\right) \times 100$$

5 6 7 8

Figs. 5-8. Treatment by *Latrodectus geometricus* spiders. 5. Eggplant after spider release, normal growth signs. 6. Squash before pest infection. 7. Squash after spider release. 8. Squash after pest infection and spider release, normal growth signs.

Results and Discussion

The experiment was performed by three treatments and control. Repeated infections were carried out at three levels (5, 10, 15) individuals/leaf respectively and control (Figs. 1-4). The spiders, *L. geometricus*, were released after 10 days of infection.

It is generally noticed that T1, T2, T3 obviously reduced the population density of *T. urticae* on both eggplant and squash and the total average of *T. urticae*/leaf were (9.06, 25.83, 28.00) against 101.94 for control and (5.92, 15.58, 19.08) against 77.42 for control, respectively (Table 1), taking in consideration that there were no results for Week 7 for eggplant and Weeks 5-7 for squash.

Table 1. Numbers of *Tetranychus urticae*/leaf on two cultivations of eggplant and squash affected by releasing the spider species *Latrodectus geometricus*.

Cultivation	Weeks	T1	T2	T3	Control
Eggplant	week 1	19.67	51.67	64.00	51.33
	week 2	16.67	44.33	44.67	61.33
	week 3	12.33	29.33	27.00	97.67
	week 4	5.67	19.67	19.67	115.33
	week 5	0	7.67	11.33	132.33
	week 6	0	2.33	1.33	153.67
	week 7	0	0	0	0
	Mean***	9.056 c	25.833 b	28.000 b	101.944 a
Squash	week 1	11.33	23.33	36.33	30.67
	week 2	8.00	20.33	22.67	56.33
	week 3	4.33	12.00	12.67	96.67
	week 4	0	6.67	4.67	126.00
	week 5	0	0	0	0
	week 6	0	0	0	0
	week 7	0	0	0	0
	Mean**	5.917 b	15.583 b	19.083 b	77.417 a

T = Treatment 1, 2, 3. *** = No significant differences between treatments with (ANOVA) test.

Statistical analysis showed that there was no significant differences between treatments, but there are significance between treatment and control. Also, data presented in Table (2) showed percentage reduction as a result of releasing the spider *L. geometricus* giving the highest percentage reduction of *T. urticae* with first treatment in the fourth week by (71.8) (81) while in the second and third treatment it was in the sixth week by (80.9, 92.8) (69.7, 100) respectively on eggplant and squash respectively, followed by the mean of: T1 92.9, T2 73.0, T3 70.9 on eggplant and T1 86.3, T2 72.0, T3 81.4 on squash cultivation respectively. Statistical analysis showed that there was no significant differences between treatments, but there are significance between treatment and control.

Table 2. Percentage reduction of *Tetranychus urticae* individuals/leaf on two cultivations of eggplant and squash affected by releasing the spider species *Latrodectus geometricus*.

Cultivation	Weeks	% Reduction percentage of *Tetranychus urticae*								
		T1			T2			T3		
		1	2	3	1	2	3	1	2	3
Eggplant	week 1	22.1	29.9	18.2	-1.3	-7.1	6.5	11.7	22.1	16.9
	week 2	28.9	30.3	28.3	27.6	36.1	19.8	40.9	41.4	42.5
	week 3	55.7	58.1	47.7	55.3	58.1	61.8	60.8	70.1	55.8
	week 4	50.6	57.7	71.8	52.4	42.5	33.5	40.7	28.0	42.6
	week 5	100	100	100	61.3	72.5	64.0	50.2	48.7	50.2
	week 6	100	100	100	78.5	56.9	80.9	92.8	91.4	85.6
	week 7	100	100	100	100	100	100	100	100	100
	Mean**	87.6	89.4	92.9	73.0	67.9	69.6	70.9	67.0	69.6
Squash	week 1	15	28	34.8	28.3	25.0	18.5	17.4	21.7	23.9
	week 2	66	55	61.9	50.5	55.0	52.1	67.1	66.7	64.2
	week 3	71	74	58.4	65.	66.3	65.6	69.6	65.6	67.1
	week 4	81	81	69.3	61.6	51.2	58.7	74.4	70.5	70.5
	week 5	100	100	100	55.0	61.4	61.4	77.5	82.0	82.0
	week 6	100	100	100	100	69.7	69.7	100	100	100
	week 7	100	100	100	100	100	100	100	100	100
	Mean**	86.3	85.0	81.6	72.0	67.2	67.9	81.4	80.8	80.6

T = Treatment 1, 2, 3. ** = No significant differences between treatments with (ANOVA) test.

Conclusion

The experiment was carried out on two types of plants, the first is squash plant that was planted in the period from the beginning of July to the end of September and the second plant eggplant was planted from the beginning of August until the end of

December. There were one species of pest, *T. urticae*, and one species of predator, *L. geometricus*. The obtained data were compared and a percentage of each was calculated. Our results agree the study of Ahmad *et al.* (2009) on the release of the theridiid spiders of *Kochiura aulica* in a greenhouse planted with cucumber that yielded the percentage reduction of *Aphis gossypii* and their recommendation that *K. aulica* can be used in biological control of insect pests inside greenhouses. Therefore we conclude from this research that the use of this species of spiders, *L. geometricus*, in biological control has yielded satisfactory potential useful results and it is recommended to use them in *T. urticae* management strategy in the coming period, and experiments will be conducted on a larger scale. This needs improvements in release timing and strategy to provide commercially acceptable control.

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Notes on *Segestria florentina* (Rossi, 1790) and family Segestriidae in Egypt (Araneae: Segestriidae)

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Abstract

Two species of family Segestriidae are known from Egypt: *Ariadna insidiatrix* Savigny, 1825 from Alexandria and Cairo, and *Segestria florentina* (Rossi, 1790) from Alexandria and Wadi Gharandal, Sinai. This work presents a new locality for the second species, *S. florentina*, with illustrations of its newly collected single male specimen from Rasheed (Rashid, Rosetta), east of Alexandria, with distribution maps of the two species.

Keywords: Araneae, Segestriidae, *Segestria florentina*, Egypt.

Introduction

Family Segestriidae was established by Eugène Simon in 1893 as subfamily Segestriinae of family Dysderidae including two genera: *Segestria* Latreille, 1804 [The type genus] and *Ariadna* Savigny, 1825. The type species of Segestriidae is *Segestria florentina* (Rossi, 1790) described as *Aranea florentina* by Petrus Rossius (Rossi, 1790: 133) from Florence, Italy.

Now, Segestriidae includes 134 species and 1 subspecies of 4 genera (World Spider Catalog, 2020):

1. *Ariadna* Savigny, 1825	[107 spp.: Europe, Mediterranean, Africa, Asia, Australia, New Zealand, North and South America]
2. *Citharoceps* Chamberlin, 1924	[2 spp.: USA and Mexico]
3. *Gippsicola* Hogg, 1900	[4 spp.: Australia]
4. *Segestria* Latreille, 1804	[21 spp. +1 ssp.: Europe, northern Africa, Madagascar, Mediterranean, Asia, New Zealand, North and South America]

Historical notes on Segestriidae

Petrunkevitch (1933) proposed to elevate the Segestriinae to family rank, but it was maintained in the Dysderidae for a long time although Lehtinen (1967: 303) supported the elevation and used the term Segestriidae.

Beatty (1970: 451-456) compared the structural characters of the two genera *Ariadna* and *Segestria* (p. 455, Table 1) and discussed the characters of the Segestriinae as a subfamily of the Dysderidae.

Brignoli (1976: 19-35) discussed the characters of family Segestriidae and presented his notes and observations on *Ariadna insidiatrix* (pp. 35-39) and *Segestria florentina* (pp. 40-42); he applied what Petrunkevitch proposed in 1933 of elevating the Segestriinae to family rank. Forster & Platnick (1985: 212) limited "the superfamily Dysderoidea to four families: the Dysderidae, Segestriidae, Oonopidae, and the newly established family Orsolobidae" (Grismado & Izquierdo, 2014).

Wunderlich (2004: 657-658) presented a diagnosis of family Segestriidae, in detail, and a comparison between the two subfamilies: Ariadninae and Segestriinae. Later, he raised the status of the subfamily Ariadninae Wunderlich, 2004 to family level (Wunderlich, 2020: 74-75). The World Spider Catalog maintains "the current status (Ariadninae and Segestriinae as subfamilies of Segestriidae) for reasons of stability" (World Spider Catalog, 2020).

The araneomorph-colulate family Segestriidae was diagnosed (p. 152) and both *Ariadna insidiatrix* Savigny, 1825 and *Segestria florentina* (Rossi, 1790) from Spain and France were fine illustrated by Roberts (Murphy & Roberts, 2015: 472-473, pls. 275-276).

Fig. 1. *Segestria florentina* (Rossi, 1790) ♂ from Rasheed, habitus, dorsal view, alive.

Taxonomic treatment

Segestriid spiders are easily recognized by their most remarkable character: three leg pairs directed forward, instead of two (Fig. 1). They are called "Tubeweb spiders" because their webs, made of non-sticky silk, are radiating from holes in substrate (Jocqué & Dippenaar-Schoeman, 2006).

Diagnostic and descriptive characters

Medium-sized araneomorph spiders (5-16 mm); ecribellate; haplogyne; with six eyes, in two rows (Figs. 2-3); endites longer than wide (Fig. 8); leg with three tarsal claws; legs I-III directed forwards (Fig. 1); tibiae and metatarsi I with double row of spines ventrally; legs III and IV short and stout in *Ariadna,* longer and more slender in *Segestria*; leg IV with few spines in *Ariadna*, numerous spines in *Segestria*; abdomen longer than wide, cylindrical; hirsute; without pattern, or with pattern consisting of transverse bars in *Ariadna*, and dark, median, longitudinal stripes in *Segestria* (Figs. 10-11); with two booklungs and a second pair of anteriorly positioned tracheae opening through distinct spiracles situated behind epigastric groove (Fig. 12); colulus fairly large and furnished with setae (Fig. 13); male palp with bulbus simple, inserted medially (*Ariadna*), or inserted over most of basal third of tarsi (*Segestria*); embolus varies from elongated (*Segestria*) (Figs. 14-15) to short (*Ariadna*) (Dippenaar-Schoeman & Jocqué, 1997; Jocqué & Dippenaar-Schoeman, 2006; Murphy & Roberts, 2015).

Abbreviations used: AbL = abdomen length, ACE = Arachnid Collection of Egypt, ALE = anterior lateral eye, CL = carapace length, CW = carapace width, PLE = posterior lateral eye, PME = posterior median eye, TL = total length.

All measurements are in millimetres (mm).

Family **Segestriidae** Simon, 1893

Key to genera found in Egypt (adopted from Simon, 1893: 321)

1- Median eyes form with anterior lateral eyes an almost straight line (Figs. 2,7). Labium is not apically attenuated, with straight edge. Inferior margin of chelicera with two strong teeth. Tibiae and metatarsi of anterior legs sparingly aculeate .... ***Segestria***

- Median eyes form with posterior lateral eyes an almost straight line (Fig. 3). Labium is apically attenuated and obtuse. Inferior margin of chelicera muticus (curtailed) [with one small tooth (Wunderlich, 2004: 658)]. Tibiae and metatarsi of anterior legs equipped with long stooped spines, numerous regularly biseriate underneath .... ***Ariadna***

Figs. 2-3. Eyes arrangement. 2. *Segestria florentina* ♀. 3. *Ariadna insidiatrix* ♀. (After Audouin, 1825: pl. 1, f. 3*æ'*, 2*æ'*)

Genus ***Ariadna*** Savigny, 1825
Ariadna insidiatrix Savigny, 1825
Figs. 3-4.

World Distribution: Mediterranean (World Spider Catalog, 2020).

For the description and illustrations of *A. insidiatrix* see Brignoli (1976) and Kunt *et al.* (2012). For its synonyms see World Spider Catalog (2020).

Etymology
Ariadna
Ariadne (Greek: Ἀριάδνη; Latin: *Ariadne*) was a Cretan princess in Greek mythology. She was mostly associated with mazes and labyrinths because of her involvement in the myths of the Minotaur and Theseus. Ariadne was the daughter of Minos, the King of Crete and son of Zeus, and of Pasiphaë, Minos' queen and daughter of Helios. Ariadne married Dionysus and became the mother of Oenopion, the personification of wine, Staphylus, who was associated with grapes, and others (Wikipedia, 2020).

insidiatrix
īnsidiātrīx (f) Latin noun = lurker; plotter (Wiktionary, 2020).

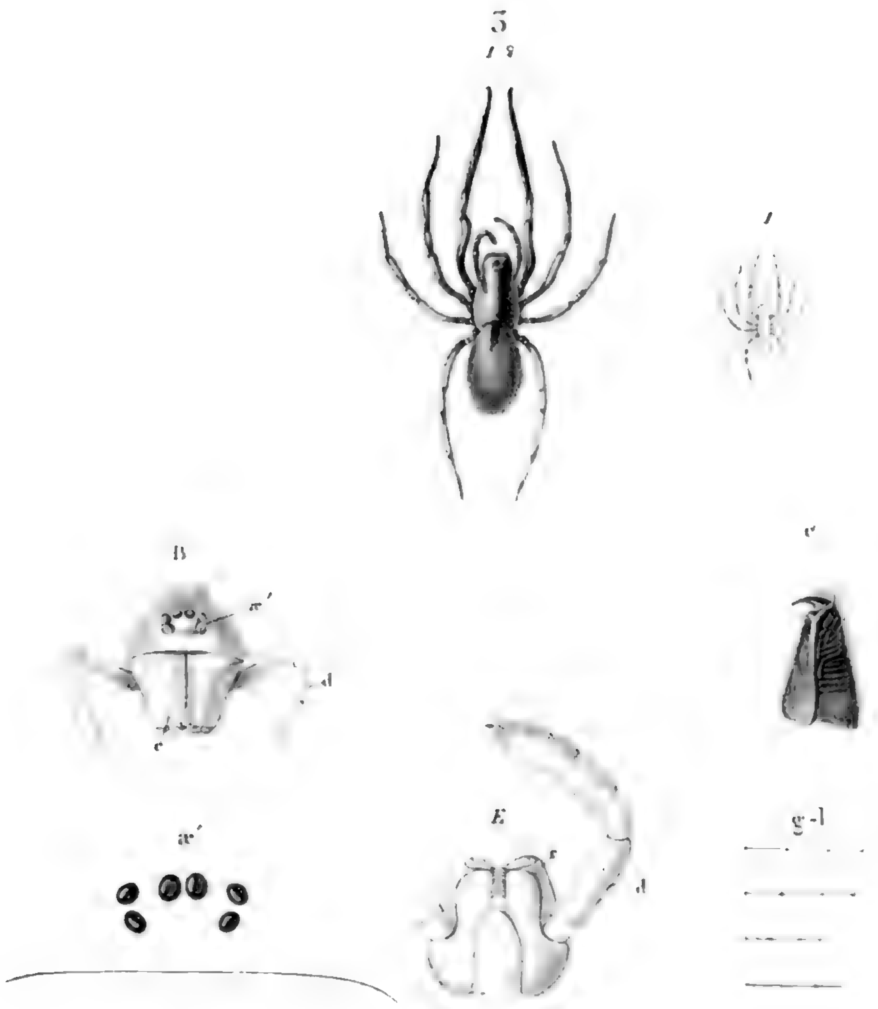


Fig. 4. *Ariadna insidiatrix* Savigny, 1825 ♀ (After Audouin, 1825: pl. 1, f. 3).

Distribution of *Ariadna insidiatrix* in Egypt:

The female of *A. insidiatrix* was described as new genus and new species from Egypt by Savigny in Audouin (1825: 109-110; 1827: 308-309)(Fig. 4). This species was found "De l'intérieur des maisons d'Alexandrie" (= inside houses in Alexandria). Pickard-Cambridge (1876: 547) could find an adult female among débris of an old mud wall near Cairo, in January 1864. Later, Simon (1911: 331) recorded it as *Ariadna spinipes* (Lucas) = *A. insidiatrix* Audouin, Descript. Eg., ex Savigny, atlas, tab. I, f. 7 (non Forskôl). Égypte.

No other specimens were collected of *A. insidiatrix* after Pickard-Cambridge (1876). El-Hennawy (1990, 2002, 2006, 2017) only published its name and known localities: Alexandria, Cairo (Map 1).

Genus ***Segestria*** Latreille, 1804
Segestria florentina (Rossi, 1790)
Figs. 1,2,5-15.

World Distribution: Europe, northern Africa, Turkey, Georgia. Introduced to Brazil, Uruguay, Argentina (World Spider Catalog, 2020).

For the description of *S. florentina* see Brignoli (1976) and Giroti & Brescovit (2011) who redescribed it from South America, in detail. For its synonyms see World Spider Catalog (2020).

Etymology
Segestria
Segestria (L: *segestre*) a covering or mantle : tube shaped retreat ? (Parker, 1999: 16).
segestre Latin noun (plural segestria) = A covering to protect goods from the weather (Wiktionary, 2020).

florentina
florentina (L: *Florentinus*) from Florence, Italy (Parker, 1999: 10).

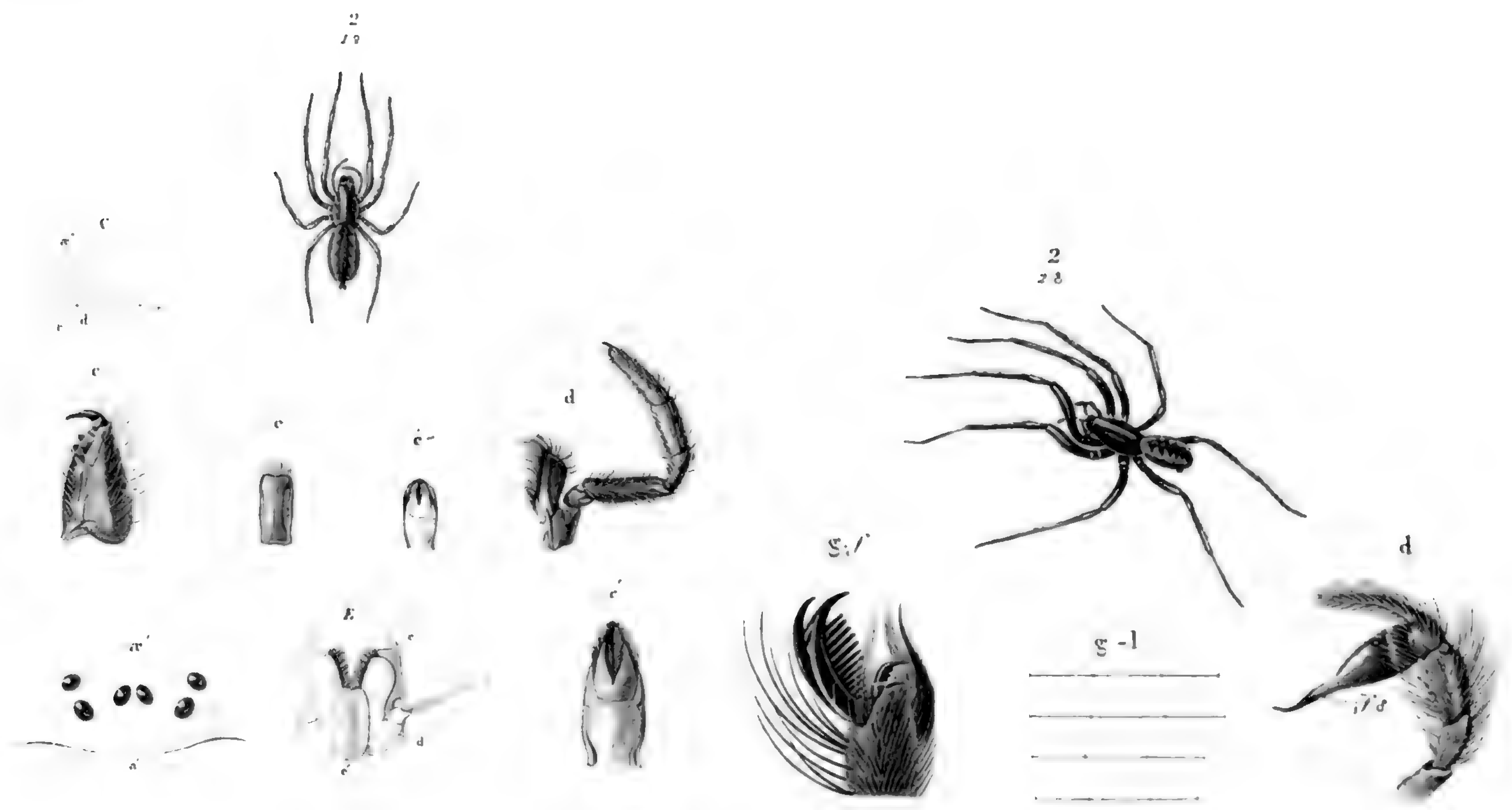


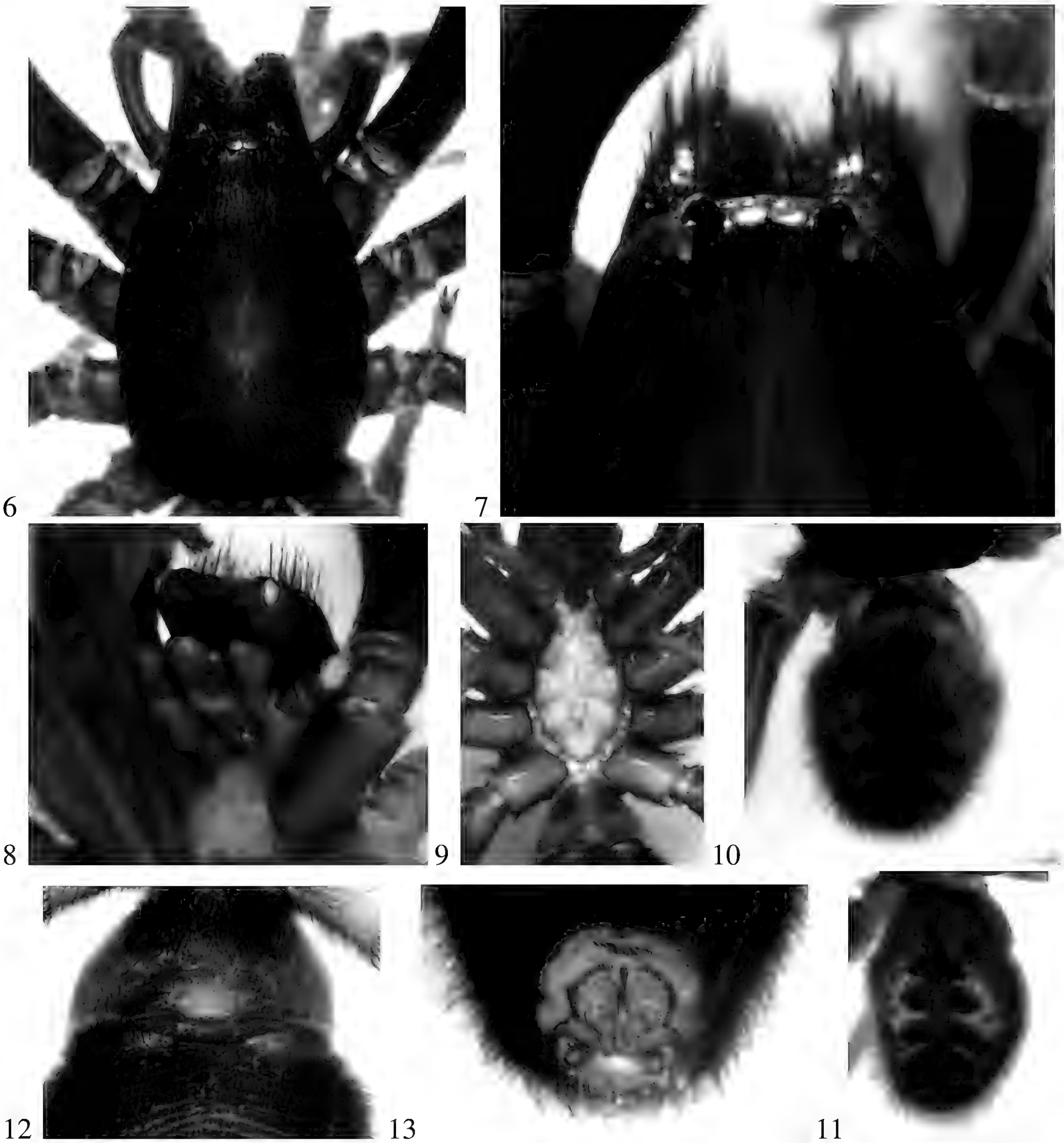
Fig. 5. *Segestria florentina* (Rossi, 1790) ♀♂ (After Audouin, 1825: pl. 1, f. 2).

Distribution of *Segestria florentina* in Egypt:
The male and female of *S. florentina* were described from Egypt by Savigny in Audouin (1825: 108-109; 1827: 305-307)(Fig. 5) as *Segestria perfida*. This species was found in Alexandria:
♂ Des caves d'Alexandrie (la cave = cellar) (= from cellars in Alexandria),
♀ De l'intérieur des maisons d'Alexandrie (= inside houses in Alexandria).
Pickard-Cambridge (1871: 819) recorded *Segestria perfida* from Wady Gherandel, pen. Sin. [Gharandal well (29°15'15.4"N, 32°54'49.1"E); Wadi Gharandal is the only wadi in South Sinai which has surface water flowing all year long, bordered with *Tamarix* shrubs, palms and reeds the water can be followed all the way to the sea [Suez gulf] (Rafik Khalil, pers. comm.)]. Later, Pickard-Cambridge (1876) did not mention *Segestria*, even in the "List of Egyptian spiders not found by myself, but described and recorded by other Authors" (628-629) (?!).
Pavesi (1878: 379) reported *S. florentina* (P. Rossi) from Basso Egitto (= lower Egypt). Also, Simon (1911: 331) reported *S. florentina* (Rossi) from Égypte: Alexandrie (sec. *Savigny*) saying that he did not see its specimens from Egypt and that Cambridge [1876] did not cite it although it is figured and described by Savigny & Audouin from Alexandria "nous ne l'avons jamais vu d'Égypte et le Rev. O. P. Cambridge ne le cite pas,

mais il a été figuré par Savigny (pl. 1, fig. 2), et d'après une note publiée par Audouin il se trouve dans l'intérieur des maisons d'Alexandrie."

Thus, no other specimens were collected of *S. florentina* after Pickard-Cambridge (1871). El-Hennawy (1990, 2002, 2006, 2017) only published its name and known localities. Now, after finding it in Rasheed, its distribution is: Alexandria, Wady Gherandel, Sinai, and Rasheed (Rosetta) (Map 2).

New material examined. Egypt, El-Beheira Governorate:
- 1♂ Rasheed (Rashid, Rosetta) [1 km before Rashid entrance] (about 31°23'30"N, 30°24'54"E, elev. 7 m), 2 December 2018, found in its tube web on the trunk of a vine tree, leg. Ibrahim Zaher [ACE.2018.12.04.AR.001].



Figs. 6-13. *Segestria florentina* (Rossi, 1790) ♂. 6. Carapace, dorsal view. 7. Eyes. 8. Endites (maxillae) and labium. 9. Sternum. 10-11. Abdomen, dorsal view showing its hirsute appearance and the hidden pattern. 12-13. Abdomen, ventral view. 12. two booklungs and a second pair of tracheal spiracles. 13. Spinnerets and colulus.

Measurements:
♂ TL 12.7, CL 7.2, CW 4.6 (thoracic region), AbL 5.5.

Table 1. Measurements of leg segments of *Segestria florentina* (♂).

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
I	6.5	2.5	7.0	7.0	1.6	24.6
II	7.5	2.8	7.0	4.5	1.7	23.5
III	5.3	2.0	6.5	6.0	1.5	21.3
IV	6.0	2.0	6.5	5.4	2.0	21.9

Legs 1243, Femora 2143

Eyes (diameters and inter-distances):
PLE - ALE - PME --- PLE-ALE, ALE-PME, PME-PME
0.28 0.34 0.28 0.04 0.10 0.04

Eye length ratio, ALE:PME:PLE, 1.2:1:1.

Male palpal organ see Figs. (14-15).

14 15

Figs. 14-15. *Segestria florentina* (Rossi, 1790), male palp. 14. prolateral view. 15. retrolateral view.

Tubeweb and behaviour

Segestriids make a tubular, silk-lined retreat in a variety of situations: in rocks, walls, holes in bark, and branches. Silk lines radiate from the opening of the retreat and alert the spider to potential prey (Murphy & Roberts, 2015: 152). Vibrations transmitted to the spider via the trip-lines (silk threads) betray the presence of prey. In *Ariadna* the opening of the tube is provided with a small collar of regular white silk. In *Segestria* the opening widens much more at the mouth. The spider waits in the entrance of the tube, with six legs stretched forward (Dippenaar-Schoeman & Jocqué, 1997: 271, 273).

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Map 1. Distribution map of *Ariadna insidiatrix* Savigny, 1825 in Egypt.
Red circles = literature records [1 = Alexandria, 2 = near Cairo].

Map 2. Distribution map of *Segestria florentina* (Rossi, 1790) in Egypt.
Red circles = literature records [1 = Alexandria, 2 = Wady Gherandel, Sinai].
White circle = new locality record [Rasheed (Rosetta)].

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Serket in *Normandie*

Prof. Dr. Wilson Lourenço (MNHN), the great scorpiologist, described a new genus and six new species of scorpions from Egypt, one of them published in *Serket*. *

Now, he has a beautiful house in Normandie called *"Serket"* too! The ancient Egyptian goddess *Serket* (*Serqet*) is lucky to be memorized and honoured by this beautiful house in addition to her humble arachnological bulletin too.

Thank you Dr. Wilson Lourenço.

* *Egyptobuthus vaissadei* Lourenço, 1999 [n.gen., n.sp. from Sinai]; *Microbuthus flavorufus* Lourenço & Duhem, 2007 [n.sp. from south of Zafarana]; *Compsobuthus egyptiensis* Lourenço, Sun & Zhu, 2009 [n.sp. from Siwa]; *Hemiscorpius egyptiensis* Lourenço, 2011 [n.sp. from ?Philae and Nubia]; *Buthus egyptiensis* Lourenço & Cloudsley-Thompson, 2012 [n.sp. from Siwa]; *Buthus orientalis* Lourenço & Simon, 2012 [n.sp. from Alexandria].